# THE IRON TRADE REVIEW

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## THE IRON TRADE REVIEW.

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CLEVELAND, O., FEBRUARY 11, 1892.


## THE WEEK IN IRON CIRCLES.

General Features.

One of the most encouraging features of the iron market, otherwise halting and somewhat uncertain, is the entire absence of a speculative feeling. This is in marked and agreeable contrast to the British pig iron market, which has recently undergone a collapse and general disorganization under the manipulation of the London speculators in Scotch storage warrants. The trade in this country may well be congratulated upon the fact that it is not subjected to the violent fluctuations which, under the warrant system, exert such a baleful influence abroad. The financial situation at our leading centers continues easy. There is a good deal of money everywhere, but the disposition to use is wanting. Rates at the banks are slowly declining, and it is a question how long the holders of idle funds will be willing to forego their earning power and refrain from making investments. Considerable interest is now being taken in course of the Southern iron market, and the fact is noted that Northern men are making strenuous efforts to regain a portion of their trade in foundry iron, which has been neglected and given to the Southern men for a long time past. In this they are fairly successful. On the other hand, it is said that one large Southern company at least has been pressing sales at lower range of prices, which has at times necessitated some others to meet them to secure business. At Louisville, there has been no improvement in iron dur ing the past week, $9.50 for grey forge being the market price, though a few transactions have been made at a shade less, one of 6,000 tons at $9.40 furnace having been made. Stocks of all grades save No. 3 foundry are but moderate, except one company that declined to sell after grey forge went below $10.00; they have some ten thousand tons on hand. The demand at Detroit certainly seems to be very slow, and can hardly be termed satisfactory, particularly in view of the fact of the abundant supply both on hand and being manufactured from week to week by furnaces in all direc tions. There have been some light transactions for quick deliveries for Southern and Northern foundry irons, and an occasional order for a round lot of 500 to 1,000 tons for longer delivery. There is no apparent change in prices whatever, any concessions being those for delivery rather than based prices being altered. A good amount of business is still going on in Chicago pig iron circles, the demand being mainly for Northern and Southern cokes. During the past week a number of large contracts have been placed. In several instances deliveries have been through the entire year, and prices even on these deliveries have been shaded below bottom quotations. Other buyers are in the market figuring on contracts extending over six to ten months. Charcoal irons remain for the most part inactive, various Lake Superior furnaces holding at $17 as minimum, while two or three leading companies are refusing to sell below $17.50, Chicago. There is a fair amount of activity in and around Buffalo, but as yet the volume of business is by no means satisfactory. Cincinnati dealers have enjoyed a fair run of orders for pig iron during the past week. At St. Louis one large buyer claims to have bought a 500-ton lot of Southern grey forge at less than $9.50 cash, Birmingham, prompt shipment.

The Local Situation.

The vessel market shows little signs of activity. Besides the tonnage reported as taken from the head of the lakes, at $1.25, there has been covered about a hundred thousand tons of Escanaba ore, at one dollar; but the vesselmen as a rule are holding out for a higher figure, and although they ask $1.10, the chances are that there would be little difficulty in engaging by far the larger tonnage at five cents less than the figure named. Very little has been done as to the Marquette figure, the vesselmen claiming that the small coal tonnage destined for that port, and the shallow water in the Soo make Marquette a less desirable port for shipment.

Iron Ore.

The ore trade is also quiet, the last sales of any importance being those recorded for the Wheeling district, which includes a good many river furnaces. What little non-Bessemer is sold, is taken for mixtures, and is '91 product, no non-Bessemer sales of '92 ore being known here. The ore producers themselves are not anxious to make a market in the face of a lack of demand, preferring, rather, to await an active buying movement before making a price which, in all likelihood, they would have to disturb later on. They feel none too sure, however, of a good year, and if their sales will depend upon the volume of business in the products of pig iron, the chances of doing much business before the opening of navigation are exceedingly slim.

Pig Iron.

No improvement is noticeable in the apathetic condition of the furnace trade, and the increase of stocks is going right along. Almost all the furnaces are working up stock, by far the largest portion of the Fall orders having been delivered. The orders that are reported are generally of the car-load kind, round lots not being wanted by anybody, at any price. Although this is usually a dull season for the charcoal market, most consumers of charcoal iron buying up to the opening of navigation, the unprecedentedly large overplus of charcoal irons is causing widespread astonishment. The foundry market is also dull, but one reason cited in this connection is the lack of work on the part of foundrymen. Bessemer iron which, not long ago, made a little spurt on the strength of the heavy orders placed by the railway companies, has sagged down again, and the $15.75 price in Pittsburgh has declined to $15.15, which makes the price at the furnace $14.45. It must be a very fortunate concern that can sell Bessemer iron at that figure, and make money. About the only consolation that comes to the furnace trade in this time of dullness is the fact that the Southern furnaces are, for the time at least, shut out absolutely from the markets of the Central West, no amount of shading of prices being able to overcome the difference that exists in facilities for transportation in favor of the Northern furnaces. There is no prospect of improvement in the immediate future, and about all that is left for the trade is to await its turn.

Merchant Iron.

Merchant iron is to a very large extent affected by the general lack of business movement, and the prices for bar iron and sheets are among the lowest on the list. The recent break in the combination which has for years controlled the making of shapes, such as beams and channels, has long been discounted, nearly every one in the combination having, from time to time, shaded prices, as now appears in the mutual recriminations indulged in by the parties to the combination. The facts were stated in these columns a year or more ago, but were at that time bitterly disputed by the local agent for one of the combination mills. The result of the smash-up is that what was formerly known as combination iron may now be had for 2.4 cents, a reduction of fourteen dollars a ton.

Hardware.

The hardware market has not as yet experienced the boom predicted for it, and metals are decidedly weaker. There is little demand for builders' hardware, but the business in manufacturers' supplies is good, and is indicative of a fair Spring trade.

## IMPORTANT MOVEMENTS IN COKE CIRCLES.

Recent movements in coke circles are of the utmost importance to the iron trade. First, we have direct confirmation from a Mahoning Valley furnaceman of the report that the iron companies of that district have fully resolved to break away from the domination, as they term it, of the Connellsville syndicate and to make their own coke. They have been looking at some coke lands in the Connellsville region and elsewhere, and are convinced that they can procure an abundant supply for their own uses independent of other sources. Necessarily their movements are guarded, but some important developments may be expected in the near future.

The growth of the New River coke industry, in Virginia, may have a more important bearing upon the iron industries of Ohio than is generally appreciated. Of its great value as a fuel there can be no doubt, and that it can be most cheaply produced is beyond question. Here is a comparative analysis recently published by the *Iron Belt*:

| Name of District. | Fixed Carbon. | Volatile Matter. | Water. | Sulphur. | Ash. |
|---|---|---|---|---|---|
| Chattanooga | 80.513 | 1.101 | 0.447 | 1.595 | 16.344 |
| Birmingham | 87.299 | 0.803 | 0.157 | 1.195 | 10.545 |
| Connellsville | 88.962 | 0.428 | 0.060 | .810 | 9.740 |
| New River | 91.608 | 0.214 | 0.500 | .500 | 6.188 |
| Pocahontas | 92.550 | 0.757 | 0.347 | .597 | 5.749 |

The following figures give a good idea of the cost of coke making in the districts, a charge of 8,000 pounds to the oven and a yield of sixty-two and one-half per cent., say two and a half tons (2,000 pounds) of coke being assumed:

| | Per oven. | Per ton (2,000 lbs. of coke. |
|---|---|---|
| Charging | .05 cents. | .02 cents. |
| Leveling | .08 " | .03½ " |
| Drawing | .50 " | .20 " |
| General labor | | .02½ " |
| Cleaning ovens | | .01 " |
| Supplies and repairs | | .07 " |
| Total | | .36 cents. |

If the charge is more than 8,000 pounds some of these items will be proportionately reduced. On a charge of 10,000 pounds the coke would cost five cents a ton less. Assuming that the coal costs, not including royalty, sixty-two and one-half cents per ton of 2,240 pounds, or 55.8 cents per ton of 2,000 pounds, and that it requires 1.6 tons of coal to make a ton of coke, the cost of a ton of coke on the basis of the above figures would be as follows:

| | |
|---|---|
| 1.6 ton coal at 55.8 cents | .89¼ |
| Cost of Coking | .36 |
| General expense | .05 |
| Royalty (15 cents on 2,240 pounds) | .134 |
| Total | $1.4365 |

The production of the New River district in 1891 was 1,380,802 gross tons, as compared with 1,136,317 gross tons produced in 1890, an increase in 1891 of 244,485 tons. This coke is gradually making its way northward and westward and is destined to become an important factor in the early future.

Another feature of the coke trade of much interest to iron men is the development of a coking industry at the head of Lake Superior, attention to which has already been called in these columns. According to the Connellsville *Courier*, during the year 1891 no less than 60,000 tons of Connellsville coal were shipped to the Lehigh Coal and Iron Company, at West Superior, Wis., a distance of 1,300 miles.

The coal is shipped from the Connellsville region to Cleveland by rail. There it is loaded on whaleback boats, having an average carrying capacity of 2,200 tons. The freight to West Superior is 50 @ 60 cents per ton, netting the boats $1,100@1,300 for the trip. The costs per ton, compared with the cost by rail, are thus given by a coke man who has made himself familiar with the subject:

WEST SUPERIOR COKE.

| | |
|---|---|
| Coal at Cleveland | $2.00 |
| Freight to West Superior | 60 |
| Total for ton of coal at West Superior | $2 60 |
| 1½ tons of coal to 1 ton coke | $3.90 |
| Coking | 50 |
| Handling coal | 25 |
| Total cost 1 ton coke at West Superior | $4.65 |

CONNELLSVILLE COKE.

| | |
|---|---|
| At Chicago | $4.65 |
| Freight to St. Paul points | 2.00 |
| Total | $6.65 |

The Lehigh Company owns a plant of 180 ovens at West Superior, and its entire product finds a ready market at foundry coke prices. It is probable that the large coke furnace at West Superior, which now gets its coke by rail, will soon buy all of its fuel on the ground; and, indeed, this seems the more likely from the fact that the Lehigh Company is understood to have already contracted for 75,000 tons of Connellsville coal from a single firm for delivery this year. The Lake Superior iron industry is evidently looking up.

## AMERICAN SKILLED LABOR IN THE WORLD'S MARKETS.

Some interesting facts regarding the export of American machinery and hardware are to be gleaned from the official reports covering twelve months ending December 31, 1891, just issued by the Government. We select the principal items as of especial interest to the machinery and hardware trades, the following showing the value and destination of these items during the year just closed:

| Countries to which Exported. | Builders' Hardware and Saws and Tools. | | Sewing Machines and parts of | | Steam Engines and parts of, and machinery not otherwise specified. | |
|---|---|---|---|---|---|---|
| | 1891. | 1890. | 1891. | 1890. | 1891. | 1890. |
| United Kingdom | $647,669 | $594,590 | $745,496 | $999,061 | $2,045,061 | $2,065,169 |
| Germany | 235 631 | 219,630 | 633 629 | 509 280 | 680,894 | 612,843 |
| France | 53,834 | 78,075 | 228,137 | 105,147 | 340,474 | 263,764 |
| Other countries in Europe | 123,180 | 133,392 | 137,512 | 105,590 | 645,128 | 480,031 |
| British North America | 391,029 | 394.427 | 58,522 | 69,349 | 938,218 | 756,073 |
| Mexico | 339 705 | 353,707 | 149,359 | 222,520 | 1,455,118 | 1,238,790 |
| Central American States and Honduras | 154,481 | 142,019 | 100 364 | 89,734 | 385,284 | 469,847 |
| Cuba | 378,762 | 278 823 | 138,538 | 96,118 | 2,617,406 | 1,659,322 |
| Puerto Rico | 24,829 | 20,526 | 4,325 | 3,549 | 19,779 | 28,131 |
| Santo Domingo | 11,190 | 13,040 | 2,743 | 3,089 | 164,524 | 82,982 |
| Other West Indies | 89,123 | 97,307 | 26,348 | 33,538 | 146,195 | 151,669 |
| Argentine Republic | 60,798 | 103,675 | 16,379 | 30,147 | 61,143 | 448 673 |
| Brazil | 278,327 | 194,691 | 79,109 | 68,209 | 2,316,729 | 483 433 |
| Colombia | 107,436 | 96,577 | 118,074 | 107,263 | 30,195 | 149 425 |
| Other countries in South America | 213,533 | 374,147 | 150,976 | 159,731 | 466,836 | 1,119,020 |
| British Possessions in Australasia | 717,100 | 567,558 | 322,338 | 246,033 | 1,358,944 | 466,649 |
| Other countries in Asia and Oceanica | 84,708 | 116,446 | 31,598 | 27,842 | 544,844 | 626,761 |
| Africa | 107,621 | 123,338 | 11,174 | 12 210 | 255,309 | 265,126 |
| Other countries | 5,226 | 5,639 | 1,272 | 1,113 | 691 | 3,794 |
| Total | $4,024,252 | $3,907,637 | $2,955,893 | $2,889,574 | $14,522,472 | $11,371,492 |

The remarkable things about the foregoing table are:

1. The increase in our exports of builders' hardware, etc., to Germany, Cuba, Brazil and Australasia.

2. The increase in our exports of sewing machines to Germany, France, Cuba and Australasia.

3. The increase in our exports of steam engines and other machinery to British North America, Cuba, Brazil (very heavy), Australasia, France, etc.

4. The increase in our total exports of steam engines and other machinery, amounting to $3,150,980.

5. The rapid and satisfactory growth of our Central and South American export business, a sure sign of the benefits arising from our new reciprocity arrangements.

## NORTHERN CAPITAL FOR SOUTHERN INVESTMENT.

According to the *Manufacturers' Record*, by far the broadest plan of Southern development yet attempted, except a railroad corporation, is now getting under way. It is a stock company, with an authorized capital stock of $12,500,000, and its prime movers are gentlemen who have been so successful in developing the town of Middlesbrough, Ky. The objects of the company are to control in Northeastern Tennessee: (1) a residential and trade center already selected; (2) sundry groups of coal measures, coke ovens already built and in operation, and considerable areas of more or less developed high-grade hematite, magnetic and fossil ores; (3) to carry out, by purchase, contracts already made for sundry steel plants and iron furnaces, some of which are completed, others projected by people amply able to finish them; (4) to engage in or to assist in the establishment of plants in which the aforenamed and other industries will be presented, and (5) to build sundry short railroads that shall serve as connecting links between the several centers of industry that are to be established and existing trunk lines of road, that will transport the products of all that section of country, of whatever kind they shall be, to the interior or to the seacoast, as the demands of trade may require The *Record's* information is to the effect that most of the money is to be furnished by Northern capitalists.

## COLLAPSE OF THE STEEL BEAM COMBINATION.

All of the news concerning the collapse of the steel beam combination is grouped in an extended article in our news columns and no special comment is necessary. The combination was apparently a strong one, but, like nearly all such agreements, fell to pieces of its own weight. Mr. Carnegie is popularly reported as being the Samson who pulled down the temple over his own head, and it can readily be credited that he is possessed of sufficient nerve and resources to undertake the task. Whether the razing of the present combination is simply preliminary to creating another and a stronger one remains for future development. At any rate, in the language of the advertisement-writer, this is the time to buy, for beams have never been so low as now. The immediate effect, no doubt, will be to shut out Belgian beams, which have given our manufacturers considerable trouble in the past, but as there are considerable stocks of the foreign article in storage at seaboard points, competition will probably not be allowed to cease. The whole situation at present is

demoralized, and the events of the next few weeks will be watched with keenest interest.

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HERE are some fresh facts regarding natural gas: A fine flow of gas has just been struck twelve miles north of Indianapolis. Recent strikes are also reported at St. Mary's, O. (5,000,000 feet per day); Blunt, S. D., Indiana, Pa. (15,000,000 feet per day); Blair, Pa., Shawmut Pa., and near Buffalo, N. Y. Salt Lake City, Utah, is to be supplied with natural gas. Despite reports to the contrary, Findlay, O., claims to have more natural gas than it can use, there being nineteen wells closed in at present.

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*Dixie*, a bright and progressive Southern trade magazine, located at Atlanta, Ga., recently passed into new hands, the personnel of the Dixie Company being: T. H. Martin, Business Manager; J. H. Allen, Manager Advertising Department, and Colonel John Temple Graves, Editor. All of these gentlemen are highly spoken of by the Southern press, and will no doubt reap the reward of ability, experience and push. *The Iron Trade Review* extends hearty congratulations and well wishes.

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OUR musical contemporary, the *Canadian Manufacturer*, has for some time past been practicing on a new song, entitled, "Put an Export Tax on Nickel," set to the well known tune, "Canada for the Canadians." In the course of a few years it doubtless will be able to sing the song in quite diverting style.

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FURNACEMEN are again going over the old ground of studying possibilities of lower cost, in view of the slowness of the market, but it is like wheat threshed many times over—very little of value left. It is very difficult to see how costs can be materially cut down in any district in the United States.

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GENERAL influences in the pig iron market continue backward and hesitating.

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## THE GHOST OF THE COBDEN CLUB.

Americans have always been interested in the Cobden Club, that British organization designed to aid Great Britain commercially and industrially by propagating Free Trade doctrine and securing Free Trade legislation in other countries. The Cobden Club is a failure. The London *Times*, on July 12th, 1880, said of it:

"How Free Trade will come some day to the United States must be left to the Cobden Club and to its twelve Cabinet Ministers in their unofficial capacity to decide. * * * It is to the New World that the club is chiefly looking as the most likely sphere for its vigorous foreign policy. It has done what it can for Europe, and is now turning its eyes westward and bracing itself for the struggle which is to come. So it will go on until reason has destroyed Protection in the great stronghold (United States) in which it has intrenched itself. * * * We intend to break down the protecting system in the United States, and to substitute the British system. That done, our victory is complete and final."

That was a magnificent programme boldly proclaimed. In 1888, the report of the Cobden Club contained this utterance on the outlook for Free Trade in the United States:

"Your committee continues to afford all the assistance in their power to those who are laboring in the Free Trade cause in foreign countries. In America in the course of political events there is great promise. * * * The result of the turning of public attention in this direction is seen in the fact that revenue reform is becoming a leading question in the Presidential contest, and is on the winning side."

The American Cobdenists in 1888 evidently thought that the prediction of 1880 was about to be realized. Now, in 1892, the London *St. James Gazette*, mentioning President Harrison's message to Congress, says:

"The most important point is that which refers to the tariff. The figures presented compare significantly with British figures, which show a stationary condition of trade. It is all well to say that Americans will presently discover the mistake in their fiscal policy, but perhaps they may not. In the meantime the calculations of the supporters of the McKinley bill are working out much better than any one in England had reason to expect."

Time seems to have played havoc with the Free Trade fetish entailed upon Great Britain by Cobden. It is very hard for Britons to understand that the citizens of the United States have cut loose from British ways of thinking, and that they have ceased to think, to act, and to legislate along the lines of British policy and British interests in preference to the interests of their own country. This truth is plain, and all nations see it plainly except the Britons. They may as well bury the Cobden Club at once. Every dollar they spend through it in this country is a dollar thrown away. It propagandism is repulsive to all patriotic Americans. Its presence in this country is undesirable. It is dead. Bury it.—[Iron Industry Gazette.

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*The Iron Trade Review*, of Cleveland, O., is one of the most valuable trade journals among the many on our exchange list, and a recognized authority on iron business.—[Shendun (Va.) News.

# THE STEEL BEAM POOL.

## ITS SUDDEN COLLAPSE—THE CAUSE AND THE RESULT.

### The Concerns in the Combination—Cutting Prices—The Structural Iron Market in a Whirl of Excitement.

**The great steel beam pool, composing most of the powerful iron beam firms in the country, has collapsed, owing to internal differences and outside competition. This combination was formed two years ago, and originally included the Passaic Rolling Mills Co, of Paterson; the New Jersey Steel & Iron Co., of Trenton; A. P. Roberts & Co., of Pencoyd, Pa.; the Phœnix Iron Co., of Phœnixville, Pa., and Carnegie, Phipps & Co., of Pittsburgh. Later six other firms were taken into the combination, among them the Illinois Steel Co., of Chicago. This pool raised the price of iron beams from 2.8 cents per pound to 3.1 cents. Lately, because of competition from Western companies outside the combination, notably the Indianapolis rolling mills, and of foreign competition, the foreign beams entirely controlled the Boston market, although they have no control here, the rate has gone down to 2 3 cents for foreign beams and 2 4 cents for American. Last week the Illinois Steel Co. called a meeting of the combination for Thursday, Friday and Saturday. This company wished to have the price of beams lowered to 2 5 cents in order that they might compete successfully with the Indianapolis mills, which is outside the combination. The Eastern firms also wished a reduction in order to meet the foreign trade more nearly on a price level, but they did not desire so great a reduction. In the discussion of this great point there arose a disagreement concerning the allotment of percentages, in which the Carnegie Co. were opposed to the others. This resulted in an ultimatum to the Carnegie Co., which they rejected, and finally in the collapse of the trust. The result will be a drop in prices for a time and a general shake up in the market.**

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## COMMENTS ON THE COLLAPSE

### A Bitter Fight in Prospect.

Last Saturday night the Beam Association, which for so long a time controlled the market for beams, closed another chapter in its checkered career. Meetings called at the instance of the Illinois Steel Co. had been held in this city on Thursday and Friday, and on Saturday it had been decided to reduce the price of beams to 2.8 cents, and that of channels to 2.50 cents. Allotments had been agreed upon, subject on the part of the representative of the firm of Carnegie, Phipps & Co. to confirmation by his principals. The latter declined to accept the ultimatum offered, and the rupture followed, which has precipitated the structural iron market into a whirl of excitement. We understand that opinions were divided among the makers as to the best policy to be pursued. Important interests demanded a reduction in the price to 2.50 cents per pound, the Western mills in particular asking it in order to stop the growing competition on the part of outside mills. The Eastern works apparently considered 2.80 cents low enough to put a stop to the importation of foreign beams. The compromise alluded to was finally reached, when the decision of Andrew Carnegie put an end to the combination. Mr. Carnegie has, during the past few years, freely expressed the desire to cut away from an alliance which forced him to pay annually large penalties for exceeding his allotment. The trade has generally looked forward to the rupture as soon as the new beam mill at Homestead would be completed. The break has not come in the manner expected. The mill in question is unquestionably the finest in the world, and is probably capable of alone making all the beams which the country now takes. It is built to roll 36-inch beams direct from the ingot in one single beat, being equipped with a 40-inch cogging train, which produces blanks far advanced toward the final shape of the beam, and with a three-high 35-inch finishing train. The cogging train has been running for some time past, while the finishing mill is rapidly approaching completion, work now going on on the tables.

There were 11 firms in the beam combination, and four works outside it were producing greater or smaller quantities of beams. It was known, too, that a large Eastern steel mill was looking into the question of equipping for steel beams. Many of the concerns in the pool are very strong, and are quite able to hold their own in a long and bitter fight; some of them have a long established trade which will be protected against the assaults of rivals. A few have failed to keep pace with modern progress in manufacturing and must succumb in the long run. With the majority of the works the beam business has been the lucrative department, the other branches yielding little or no profit. With the price of beams cut down to losing figures, the sales of other shapes will be more carefully watched. Nearly every one of the beam mills has been affiliated with bridge building, a line of work in which prices have been cut down to the lowest point, so that now there is no single branch of work to which the mills can turn for relief.

The fight threatens to be very bitter. For years it has been considered a risky thing to have any meeting, for fear of provoking hostile demonstrations, and it has been largely due to the tact and perseverance of the late Fred. J. Slade of the Trenton Works that the pool lasted as long as it did. The capacity for production, especially when the new Carnegie mill is counted in, is out of all proportion to the requirements of the country. Last year the pool mills made 196,000 net tons, and the product of the outside mills and the importations carried the whole up to about 120,000 net tons. Whether the low prices which will follow an open market will very largely increase the consumption remains to be seen. The best authorities estimate that 10 per cent. will cover any possible increase this year. It will surely take many years before consumption balances the productive capacity.

Probably the most interesting question to the trade in general is that of the course of prices in the near future. Small lots are being offered now at 2.50 cents, as against 3.10 cents, the former combination price. But the opinion prevails that it will not take long before a considerably lower rate is reached

for large transactions. While 2 cents at mill is below the cost of production of some of the works, it can certainly be done on large quantities of the heavier sizes by the best equipped mills, with steel as cheap as it now is. During the last beam fight the price went down as low as 1.90 cents.

Future importation orders are, of course, utterly out of the question. We understand that lately the greatest German mill has offered steel beams, American sections, at 2 30 cents on dock, but since that figure may soon be duplicated by American works, no business is likely. The rupture of the pool tells most severely upon those Boston importers who have been forced, in order to do business satisfactorily, to carry a stock of foreign beams. The depreciation upon the latter is, of course, very large, since the American mills will now recapture a market which has for some time past been completely controlled by the foreign shapes. It is estimated that the stock of foreign beams in Boston is about 2,500 tons.

In the iron trade generally the break is not deeply deplored. The Beam Association has been a shining mark for attack, and the feeling has prevailed that the price was held up too high for some time past. It has contributed also to keeping the market down to very low figures in other branches of the structural iron business.

It is altogether too early to judge whether or not the struggle is to be merely a preliminary for another combination, adjusted on a somewhat different basis. In any case large contracts with consumers, at low prices, are sure to be the legacy of the fight now under way. Some of the mills are even now eagerly seeking business of this character.—[Iron Age.

As yet neither buyers nor sellers have found their bearings, and little business has been done. The majority of the mills are quoting 2 50 cents, delivered, for ordinary sizes, while on the 20-inch steel beams the Passaic is naming 2.80 cents. Business has been done, however, at 2 40 cents, and there are rumors that persons connected with mills have declared that they will take business as close to 2 cents as they can get it. Some of the mills have reduced the price on undelivered material under old contracts to 2 50 cents. Bitter complaints are made concerning the action of some agents as having violated the spirit of the agreement for a long time. In the present excited condition of the market it is difficult to gauge the effect of the forces now at work, but buyers generally seem disposed to hold off, to watch for their opportunity. We do not learn that any season contracts have yet been closed.—[Iron Age Market Report.

## EFFECT ON DIFFERENT MARKETS.

### Demoralization likely at St. Louis.

The effect of the collapse of the combination is a drop of $10 a ton on beams, and not unlikely in the demoralization to ensue prices will go still lower. In this market the recession of prices has been from 3¼ cents to 2¼ cents so far.—[Age of Steel, St. Louis.

### A Marked Decrease at Pittsburgh.

Makers find it hard work to obtain full prices in all branches of structural material and lower prices have resulted. The combination of beams and channel manufacturers has dissolved and the market has become an open one with a very marked decrease in price. We quote as follows f. o. b., Pittsburgh; Angles, 1.90@1.95 cents; tees, 2 45 cents; beams and channels, 2 60 cents; sheared bridge plates, steel, 2 10 cents; universal mill plates, iron, 1.95 cents; refined bars, 1 80 cents, base.—[American Manufacturer, Pittsburgh.

### Shutting Out Belgian Beams.

In beams for structural work the market is now an open one, and prices are 20 per cent. lower than those ruling last month. This reduction will shut out Belgian beams, which, though not as good as the American article, have had a disturbing effect on the market. Beams are now lower than ever before known in this country, and it will be a matter of interest to note whether the extreme low price will increase their use for building purposes.—[Philadelphia Ledger, Feb 4.

### Timidity in the Boston Market.

In the West, advantage is very likely to be taken of the break, and then big buying takes place at reduced figures. In this market, however, it is believed the market will go even lower than it is to-day. The latest price offered by the mills in this market, yesterday, was 2.4 cents, Boston. There has been practically no buying at this price and even a movement to start a pool, the intention of which was to order 2,000 tons for which 2¼ cents would be offered, fell flat, showing an utter lack of confidence in the market. The timidity of Boston dealers is probably owing to the fact that they believe foreign iron will be offered still lower and prefer to await developments. It has been stated that there are about 2,500 tons of foreign beams in Boston. This figure is probably correct if the importers' stock and the stock held by iron workers were combined. The importers, who are really the sellers, do not hold over 700 tons at present.—[Boston Commercial Bulletin, Feb. 6.

## VARIOUS COMMENTS ON THE BREAK.

### How the Allotment Was Distributed.

The combination included twelve leading mills, as follows: Carnegie, Phipps & Co., Illinois Steel Co., Jones & Laughlin, Columbia Iron & Steel Co., Indianapolis Rolling Mill Co, Phœnix Iron Co., A. & P. Roberts & Co., Passaic Rolling Mill Co., New Jersey Iron & Steel Co., Allentown Rolling Mill Co., Pottsville Iron & Steel Co., and Reading Rolling Mill Co. The aggregate output from these mills has averaged a little over 100,000 tons per annum, besides which about 10,000 tons were made by mills not in the combination, and about 6,000 tons were imported, making a total in round numbers of about 120,000 tons. The total capacity is easily 250,000 tons per annum, and the difficulty in adjusting the proportions to each mill has finally broken up the combination. Carnegie, Phipps & Co. alone have produced about one-third of the total during the past two years, the Phœnix, Passaic, Reading, Pencoyd, Jones & Laughlin each taking from seven to ten per cent. of the total.—Philadelphia Press.

### Belgian Girders Hurting British Manufacturers, Too.

The London *Iron and Steel Trades Journal* says that a "species of foreign competition threatens a new-born British industry. For many years past the cheap Belgian rolled iron joist has been in universal employment in the construction of large buildings and factories. During the past few years great efforts have been made to establish the industry of rolled joist and girder making in steel in Great Britain. Advanced opinion among English engineers and architects favors steel in preference to iron for rolled girders. In order to recover lost ground in English trade several Belgian makers have started the manufacture of steel joists, while still more formidable competition is promised by German makers, who are copying English sizes, and threaten to flood the English market with steel girders at cheap prices, and so drive out the superior article produced in the Leeds and Middlesbrough steel districts."

### What Mr. Carnegie Says.

Mr. Carnegie, so it is currently reported, has been disinclined to continue his connection with a combination which was rather to his detriment than to his advantage, and when he refused to concur in the changes suggested by the other members of the combination, disruption followed. In consequence of this the market for beams and channels has become demoralized. Some of the mills can manufacture beams so cheaply that it seems only a question of time when the less favored concerns will be forced to the wall. It is for one thing settled that importations from Europe will not continue. The productive capacity of this country is in excess of the present demand, and even of any increased demand which is likely to occur for some time to come.—[Engineering and Mining Journal, New York.

### Prospects of Permanently Low Prices.

The prospect of permanently low prices for beams and channels is not altogether satisfactory. The opinion is freely expressed in the iron trade that the free competition which has been precipitated by the collapse of the pool may be followed sooner or later by a new combination, in which Mr. Carnegie would come in for such a share of the business as he might choose to dictate.—[Philadelphia Record.

## WORLD'S FAIR NOTES.

The Hon. W. C. P. Breckinridge, of Kentucky, according to present plans, will deliver the oration dedicatory of the Exposition buildings, on October 12, 1892.

The London Polytechnic Institute expects that its plan for bringing artisans and others of limited means to the Exposition will result in enabling 1,500 or 2,000 such persons to visit Chicago at a total expense of something like $125 or $130 each for the round trip.

The colossal statue of the Republic, which will stand on a pedestal rising from the basin in front of the Administration building, is being modeled in Paris by Daniel C. French, the New York sculptor. It will be a female figure 75 feet high.

Japan has appropriated $630,765 for its representation at the Exposition.

The Thomson Houston Electric Cos. are planning to make a united exhibit at an expense of $500,000. They want to occupy 20,000 square feet of space.

Director General Davis has declared that all applications for space ought to be presented by July 1, 1892.

The French steamship line, Havre to New York, has agreed to return free all exhibits which it brings to the Exposition at regular tariff rates.

Herr Wermuth, the Imperial German World's Fair Commissioner, has already received nearly 2,000 applications for space from the intending exhibitors of his country.

Of the $5 000,000 of bonds, which the city of Chicago voted in aid of the Exposition, $3,000,000 have been sold in New York at par and accrued interest, and the Exposition treasury has been replenished accordingly. The terms of sale are regarded very satisfactory. They are equivalent to a premium of one-third of one per cent. on the first million, two-thirds on the second, and one per cent. on the third million.

New South Wales has asked for 300,000 square feet of space.

A cablegram states that the French government is about to ask the chamber of deputies for an appropriation of 3,500,000 francs ($700,000) for the French exhibit at Chicago.

The province of Ontario, Canada, will make an extensive mineral exhibit. Canada has asked for a total of 100,000 square feet of space in the various buildings.

A consignment of exhibits for the Exposition—the first received from a foreign country—arrived at Chicago, January 26, from Japan.

### First Lake Superior Ore.

A Marquette gentleman who was in Jackson recently made a discovery which deserves to be brought to the attention of Hon. Peter White and the Michigan World's Fair commision. He met there Thomas Westron, a son of John Westron, who was one of the locaters of the famous Jackson mine, the pioneer of all Lake Superior iron mines, and one of the two men who signed the paper given to the Indian chief Margi-Geshik, assuring him of an interest in the mine for pointing out the property to them and whose heirs recently recovered this interest through the persistent efforts of Hon. F. O. Clark of this city. The Marquette man's surprise may be imagined when he discovered in Mr. Westron's yard in Jackson the first wagon load of ore ever taken out of the Jackson mine and therefore the first iron ore ever mined on Lake Superior. The propriety of having this ore made a part of the upper peninsula's mineral exhibit at the World's Fair will be apparent to all.—[Mining Journal.

# SPIRIT OF THE TRADE PRESS.

## SOME TRADE FEATURES.

### Chances of a Shipbuilding Boom.

If the price of iron in this country is kept as low here as it is in England, there is no reason why shipbuilding here should not receive a vigorous boom. The labor will cost no more here than in England, and the cost of material should be no greater for any apparent reason. If we have to contend in shipbuilding with the high price of material, there is no chance of building many ships in this country.—[Stoves and Hardware Reporter, St. Louis.

### Demoralization in Wrought Hardware.

Few things in the hardware line have been more generally demoralized for some years than wrought goods, and there seemed to be no outcome to the situation. The trade generally had accepted the situation, and any talk of an advance—and there was a good deal—met with simple incredulity. It occured lately to one of the manufacturers, however, that as there were so few of them there was no reason why they should not get together, and this once done has resulted in harmonious action and a sharp advance.—[Age of Steel, St. Louis.

### Phenomenal Production of Pig Iron.

Since our last report there has been a general slackening of trade and prices have been perceptibly weakened, while the production of pig iron still continues at a phenomenal rate. The demand is falling a little behind, and there are more sellers than buyers not only of pig iron but also in every other brauch of the trade. At the same time this condition of affairs cannot last long; the stock of raw iron in the hands of consumers, at the present rate of consumption, will soon be exhausted, when they will find it again necessary to enter the market for a supply of material to keep their mills in operation. Stocks of unsold iron are growing gradually, although the aggregate of the surplus is still small in comparison with the great consumption. It must not be imagined that the consumption of iron and steel is decreasing, for the contrary is the fact; but the great increase in productive capacity during recent years has been ratner in excess of the consumptive demand for product.—[Pittsburgh Dispatch.

### Recent Important Trade Gatherings.

Representatives of Philadelphia and other iron cornice manufacturers of the country met in annual session at Philadelphia recently. Member of the iron trade were present from Chicago, Cleveland, Cincinnati, Columbus, Pittsburgh, Boston and New York. After a review of the trade had been made, in which, says the Philadelphia *Press*, "a good showing was demonstrated, the meeting went into executive session." * * * Questions of prices, production and prospects were to be gone into in detail.

The Association of Iron and Steel Sheet Manufacturers met at the Monongahela House, Pittsburgh, recently. This association has taken up the question of wages paid in different sheet mills of the country, and an attempt will be made to equalize the wages paid in the different mills. At the present time the difference in wages paid in sheet mills is quite large and an attempt will be made to have a uniform price for the same kinds of work in all different mills.—[Iron Age.

### An Absurd Tinplate Rumor.

One of the most ridiculous reports thus far put forth to the prejudice of the domestic tinplate manufacturers is the statement that they are agitating for another increase in the duty. This rumor seems to have had its origin in St. Louis, and was put forth as one of the probable motives for the meeting of the Tinplate Association when a session was expected to be held in that city. The rumor was denied by individual manufacturers, but the association could not deny it officially, as that body has had no meeting since. It seems, however, that the denials by individual manufacturers do not have any effect. The report is treated in various quarters, and by those who should know better, as though the move were seriously contemplated by the tinplate makers. Grave arguments are made by newspaper pundits upon the small hope of success which such a scheme has with the present Congress, and much good advice is being given to the benighted manufacturers who are assumed to have discovered at least that they cannot make tinplate here unless they have still higher protection.—[Iron Age.

## COMMENTS ON LIVE TOPICS.

### Boiler Explosions Preventable.

We have received, of late, an unusually large number of accounts of boiler explosions from various parts of the country. These accounts are, in the main, extracts from local newspapers, and cannot be relied upon beyond the statement of the fact that so many were killed or injured by the occurrence. We have previously expressed the opinion that there was no occasion for boiler explosions if boilers were under the supervision of competent men. By competent men we mean men who can detect signs of weakness, and let their voice be heard in the matter. Boilers are made by reputable manufacturers with a large factor for safety; but, like everything else, they will wear out. Then it is that the skill of the engineer comes into play. The very fact that a boiler is a made oversafe—to coin an expression—leads to a belief that it will always be safe. As a matter of fact, it may not be safe for two years. Its strength is in its weakest point, and its quality in this respect must be determined by the examination of a man skilled in such matters.—[American Machinist.

### Diversification of Manufactures.

The key to success in any manufacturing business lay in the diversification of its products. Conditions are shifting, and oftentimes they shift with a great deal of rapidity. One line of manufacture may be so profitable one year that it will be heavily overdone thereafter. New inventions render obsolete one year that which was most in use the preceding one. The state of the market is always an uncertain quantity, and the manufacturer who has only one line of goods is far more at its mercy than is he who has several from which he can select one or more to push according to existing conditions. If one line of manufacturing is not profitable at a particular junction the man, firm or corporation which carries on several lines, is almost always able to select others to push which are profitable, and a plant with diversified products always yields better returns than one restricted to a single class of goods—except in a year of phenomal activity, when that particular class of manufactured product is in heavy demand, and such years come just frequently enough to unsettle business conditions.—[Ohio Valley Manufacturer, Wheeling.

### Well Put Points on Advertising—Don't Read.

In this very important phase of advertising, we note the difference between the newspaper and the trade journal. Each has its own special work, and on these definite lines each has its distinguishing vocation. One, of course, has the most readers, but as these are like the creatures in Noah's Ark—of every diversified kind, and mostly given to the every day revelations of politicians and the devil—it is manifestly impossible to expect a sale of business hay to kittens and ladies. * * * The trade journal is hardly so miscellaneous. It has specific lines, and the editorial shoe has to toe the mark. It has to be accurate as well as specific. Two and two must always be four. With this indispensable morality in its arithmetic and make up, it is, as a rule, a reliable trustee of the advertiser's money, and his "ad." He puts the pumpkin seed in the right hill. What it says the right man reads. It takes the fodder direct to the stable, and never, unless in want of an early death, cares to peddle silk where pig iron is wanted, or carry cotton to coal mines. Knitting needles are no use to men who never wear socks, nor door locks to men who never get into trousers or houses. In the trade journal all this foolery is severely let alone. Hence its value. It carries the match to the candle, and never is guilty of taking tooth picks to babies.—[Age of Steel, St. Louis.

## IRON OR STEEL FOR BRIDGES.

What follows is taken from a discussion by Mr. H. B. Seaman of Mr. Waddell's paper on "Some Disputed Points in Bridge Designing." The discussion was read before the American Society of Civil Engineers at its recent meeting.

The assumption that "in the near future, the material for the metal portions of railroad bridges will be exclusively steel" seems to me a little premature. The objections to its use have not yet been removed, and although the development of its manufacture has made possible its production with as much uniformity and economy as that of wrought iron, it still has the same objectionable structure. The objection to the use of steel in railroad bridges, is, that it resembles a refined, ductile, homogeneous cast iron, rather than a fibrous wrought iron, and although recent practice has gradually reduced the carbon until its composition approaches more nearly to that of wrought iron, it has never yet been given a fibrous structure. Steel is objectionable, because the least scratch, so fine as to be imperceptible to the closest inspection, may, in time, under vibratory strain, lead to the destruction of the member. No inspection can be close enough to avoid this danger, and the reduction of hardening elements does not eliminate it.

Tests of steel, under constant strain, are of no value whatever as a criteron for its use in railroad bridges. The development of a scratch under a single application of load would not be noticed. The chief care in the maintenance of iron bridges, and the one to which the closest inspection is directed, is the development of flaws in details. A member rarely fails because of overstrained material. There are members in bridges which have been in use for years with strains far exceeding those usually allowed and which are safe, but there are details which to all outward appearance have been perfectly sound, and which have suddenly developed flaws which, had they not been detected before the passage of a train, would have resulted in a bridge failure. It is for this reason that engineers hesitate to adopt a material the character of which favors the development of such flaws.

The general use of steel would seem objectionable for the reasons mentioned, but to cite the drifting test as an authority for its use without reaming would seem worse than to depend upon the single aplication of a load to show the development of slight flaws. "The standard drifting test" is of value only in detecting hard spots in the immediate vicinity of the hole, but cannot develop cracks or scratches caused by punching, the presence of which render reaming necessary. Enlarging the holes by drifting forces the material back upon itself and tends to close rather than to open these defects. It may indicate a soft material, as would also a tension test; but as a demonstration that soft steel does not need reaming the drifting test is a delusion.

The use of steel rails is sometimes cited as an argument for the use of this material in railroad bridges. When bridges receive the same incessant inspection in all their details as do steel rails, or when bridge members can be replaced as quickly and with as little expense as can a broken rail or splice bar, and when the failure of a bridge is attended with nothing more serious than a derailment, then may the general use of steel be advocated for railroad bridges; but until this is true it is well to proceed with caution.

### A Huge Coal Bucket.

The Ludlow Manufacturing Co., of Cleveland, tested an immense coal bucket, a few days since, with more than satisfactory results. The bucket is 66 inches in diameter and 84 inches high, and contained 8,280 pounds of Massillon coal. It tipped as easily as the buckets of smaller size, but with much less jar than any before built. The success of this trial seems to solve the problem of heavier and more powerful machinery for handling soft coal. The trouble heretofore has been to get a bucket that would be successful in handling such a large amount. A turn-over bucket could not do it.—[Marine Review.

## A NEW DOUBLE CYLINDER STEAM ENGINE.

Letters patent were granted November, 24, 1891, to John T. Lemon, of Columbus, O, on an improved double cylinder steam engine, herewith shown: Fig. 1 is a central vertical section of the cylinder, showing the crank-disk and the parts connected therewith in elevation. Fig. 2 is a detail view of the crank-pin, showing in section the pin-bushing and crank-rod ends. Fig. 3 is an end view of said pin. Fig. 4 is a vertical section of one of the cylinder guide-necks and the cross-head therein, taken at right angles with the position shown in Fig. 1. Fig. 5 is a transverse section taken on line $x\ x$ of Fig. 4.

The operation is as follows: For illustration we will suppose that the parts are in the position shown in Fig. 1 of the drawings—*i. e.*, the pistons being near the lower ends of the cylinders, and the crank-disk so turned that its crank-pin is vertically beneath the center of the disk, and that the ports of the cylinder $b$ and the upper port of the cylinder $a$ are closed by the valves $k^4$. Steam entering the lower port of the cylinder $a$ and filling the lower portion of the cylinder will operate to drive the piston $d$ and its piston-rod and cross-head upward. This upward movement will result in the turning of the crank-disk in the direction indicated by the arrow in Fig. 1, which movement will result in the downward movement of the connecting-rod $f'$, piston-rod $d^3$, and piston $d'$ of the cylinder $b$. The rotation of the crank-disk shaft $g'$ thus imparted will transmit, through the gear wheels $l\ l^2\ l^4$, such rotary motion to the valve crank-wheel $g$, as to open the lower port of the cylinder $b$ when the piston-head $d'$ shall have reached the lower portion of the cylinder $b$. The pressure thus exerted upon the piston $d'$ will result in the upward movement of the latter, which, in conjunction with the continued upward movement of the piston $d$, will result in the continuous rotation of the valve-disk until the piston $d$ shall have reached the upper portion of its cylinder, when the valve crank-wheel will have turned sufficiently to close the lower port of the cylinder $a$ and open the upper port, thus imparting a downward movement to the piston $d$ and a continuous upward movement of the piston $d'$ until the crank-pin $g^2$ is again past the center of the crank-disk. It will thus be seen that power will be transmitted to one point on the crank-disk from both cylinders, and that at no time will said crank-disk be free from the pressure of one of the cylinders, which will result in a steady movement of said crank-disk in one direction. From the herein-described connection of the connecting-rods with the crank-pin it will be seen that each of the connecting-rods is journaled upon a separate bushing, and that the outer bushing being journaled upon the inner bushing the latter forms a bearing for both rods, thus obviating any tendency toward jar which might occur from the lost motion on the crank pin or main shaft-bearing. It will be observed that the only friction between the inner and outer bushings will result from the difference in angularity of the rods. It will also be seen that by the construction described and shown and by having the weight of the counter-balance equal to the working parts of one cylinder and a part of the connecting-rod of the other the counter-balance of the engine will be complete in every direction, and by said construction the counter-balance has one set of working parts to work, against, or part of both sets at all points. This will enable the engine to run at the highest possible speed without any unequal strain or vibrating motion of the foundation or boiler on which the engine rests.

The use of the tubular cross-head with the connecting-rod extending therein and connected therewith, as described, admits of a broad bearing of the connecting rod $n$ with the cross-head pin, which greatly adds to the durability and serviceable equality of said connection. It will also be seen that a desirable increase in the bearing-surface between the cross-head and the inner surface of the cross-head guide is attained by the construction shown and described.

The following advantages are claimed by the inventor: "First, with my device for connecting the two rods to the one pin, no matter how loose the pin becomes in the bush, it will have no tendency to make a knock as one or the other engines will be acting against the pin in the direction it is traveling, the entire revolution keeping the bush continually tight against the back of the pin. The same thing will be due to the main shaft bearing and valve rod connection and my valve gear is all rotary motion, and lost motion in cogs, countershaft, reach rod, reverse lever, or any part of my valve gear would not make the least knock or cause any imperfection in valve motion, and the perfect counterbalance enables us to run at much higher speed and get more power out of a lighter engine, and use less space than in other engines, and with my valve gear I can throw the lead out of my engine and give a long admission of steam which gives an engines the most strength possible; and when light power and speed is wanted can give the engine lead and shorten the admission of steam without shortening the throw of my valve and wearing the seat concave or wire drawing the steam in the ports."

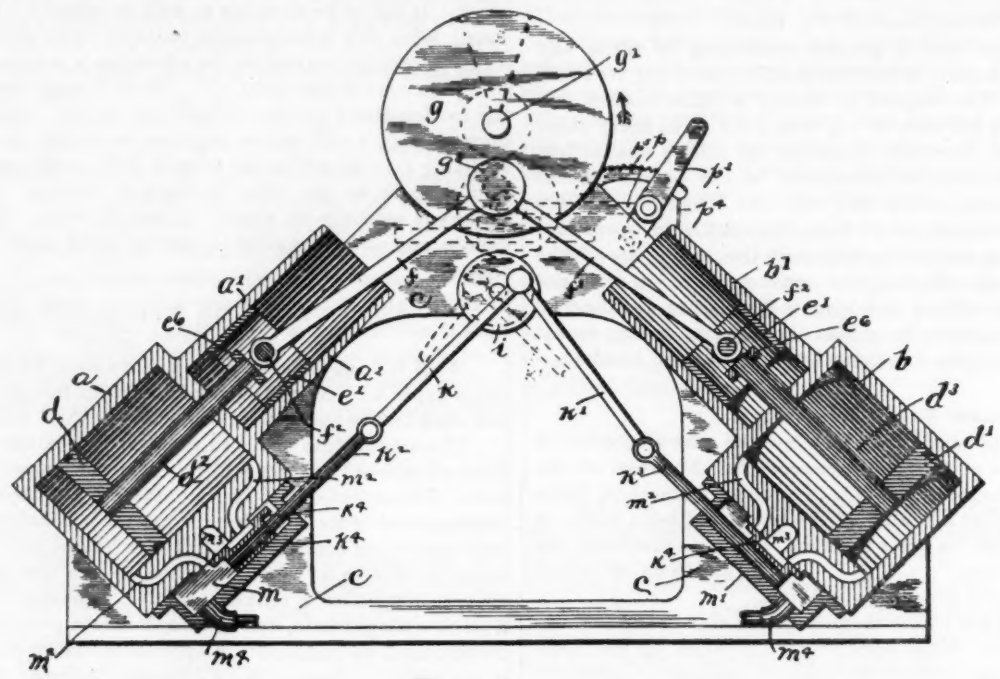


FIG. 1

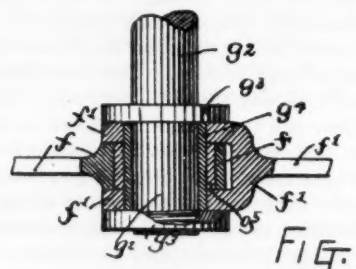


FIG. 2

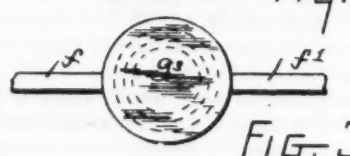


FIG. 3

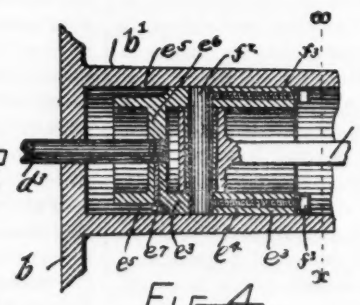


FIG. 4

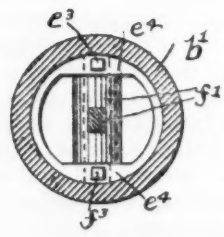


FIG. 5

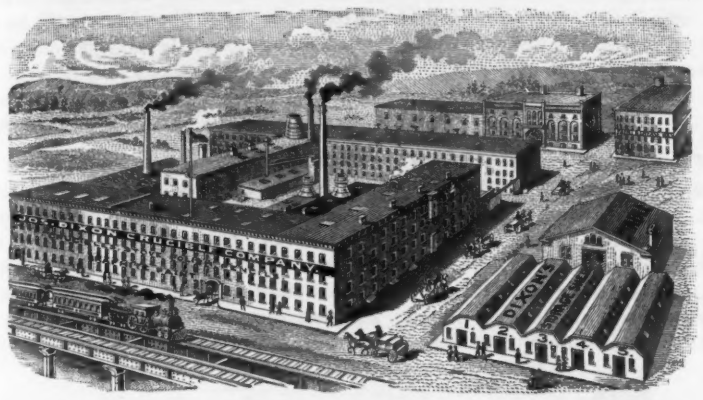
A NEW DOUBLE CYLINDER STEAM ENGINE.

### A Complete Operative Model of a Locomotive.

In the little town of Piedmont, on the Baltimore & Ohio Railroad, Stephen Paganhardt, a young mechanic, has constructed a locomotive model which is probably the most complete that has ever been built to so small a scale. It is about one-eighth size, and has every detail complete and operative that is used on a full-sized locomotive. Even the injectors were specially constructed and operate under steam pressure. There are operative steam gauges, whistle, safety valves, air brakes, air pums, etc. It will be exhibited at the World's Fair.

## THE GRAPHITE INDUSTRY.

The graphite industry is fittingly represented by the company whose founder first gave it birth. The Joseph Dixon Crucible Co, Jersey City, N. J., was founded by Joseph Dixon in 1827, who, at that time, began the manufacture of black lead crucibles and completely revolutionized the crucible business. All crucibles used at the present day for melting brass, steel, copper, gold, silver, nickel, etc., are made of blacklead (the common name for graphite), and by the Dixon process. The Dixon Co. have not only been progressive, but



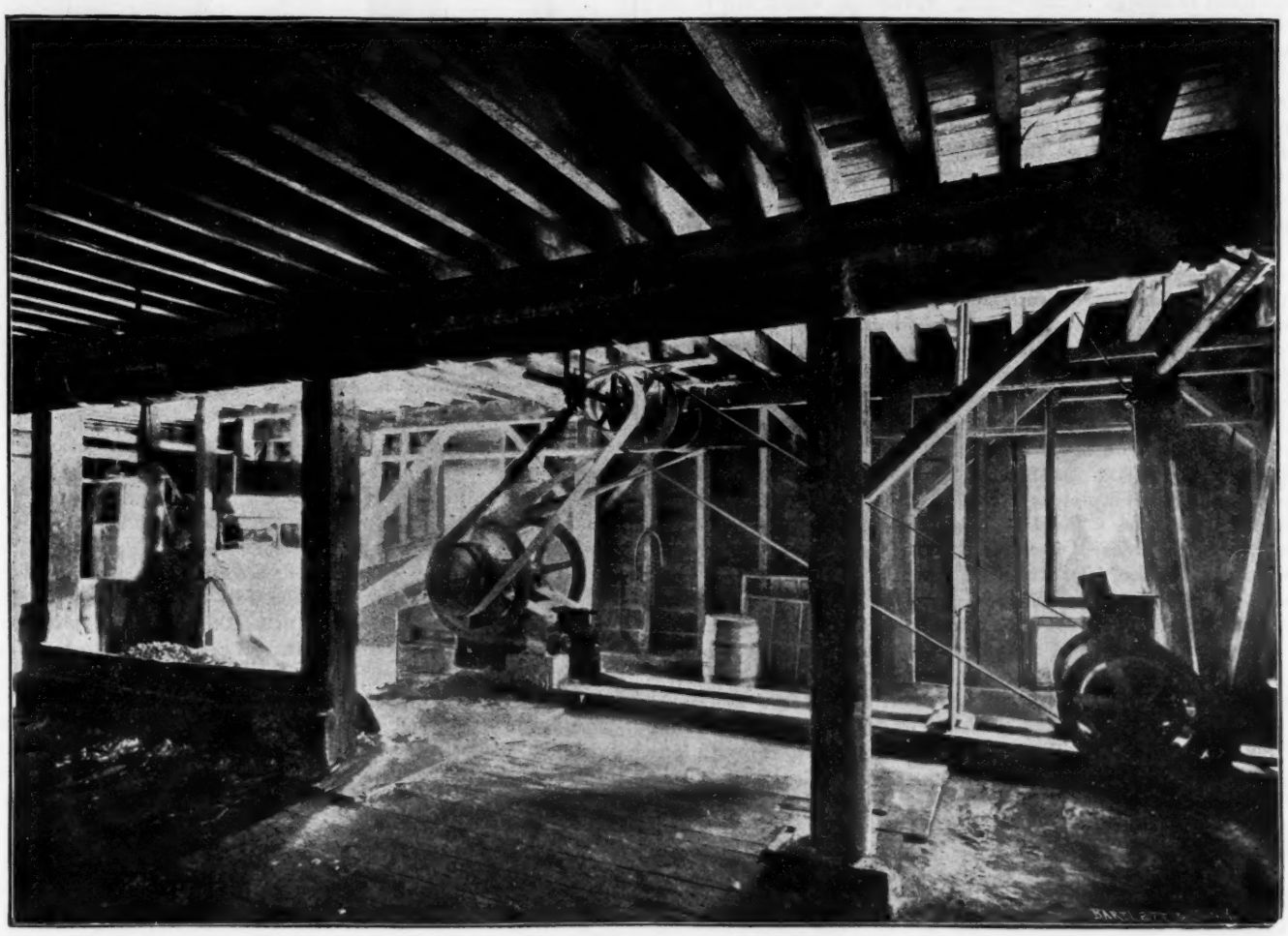

they have been aggressive, and have pushed their goods into all parts of the civilized world. During the past year they made extensive changes in their factories, and we take pleasure in showing by the illustration herewith given the main works and offices located in Jersey City. Their graphite mines are at Ticonderoga, N. Y., and their cedar mills are at Crystal River, Fla. The nature of graphite, sometimes called plumbago, or blacklead, is not generally understood; and, therefore, its great value in the mechanical arts has not been fully appreciated. Graphite is one of the forms of carbon. It is not affected by heat, cold, acids, alkalies or any known chemical solvent. It is also the best solid lubricant known to science, a remarkable conductor of heat and electricity. The peculiar qualities of graphite have given it a wide range of usefulness. It is used in the manufacture of lubricants for all purposes, crucibles, stove polish, lead pencils, foundry facings, electrotyping graphite, graphite paint, etc. The Dixon Co. are miners as well as importers of graphite in all its forms, and use no graphite that they do not mine or prepare. Their mines are located in Ticonderoga, N. Y., and they have every facility in the way of chemists and expensive machinery, etc., necessary for completely freeing the graphite from the silica, sulphur and other impurities which it contains when it comes from the mines. The company's illustrated catalogue of graphite productions is an interesting pamphlet and well worth reading. It is sent free on application.

### Harnessing Niagara.

The work of harnessing Niagara is really a colossal piece of engineering; and although it has been conducted during the past two or three years so quietly that but few reports of it have been made public, a great deal has been accomplished toward utilizing that gigantic source of energy. We are to-day on the very eve of electrical developments in the line of transmission of power that are destined, perhaps, to change profoundly our industrial methods. Until now the world has been wont to rely upon steam, or directly upon water-power, to drive the machinery of its great manufactories. Since the electric motor has sprung into prominence much has been said regarding its use for bringing to the dwellers of our great cities the energy of distant waterfalls, but until very recently comparatively little has been done, and to-day the list of plants purely for the transmission of power is not very extensive. All this is to be changed radically and permanently. Within a comparatively short distance even of New York City there is water power enough to drive half the engines of the metropolis out of business. Electrical methods are now sufficiently perfected for this transference of energy, and equally is all this true of many another city, especially throughout the great West and particularly in that splendid part of the country that lies on both sides of the backbone of the continent, a region as yet undeveloped but destined some day to become the centre of great industrial achievements. This is the epoch of the transmission of power, and the work at Niagara is but the first step of a mighty progression.—[Electrical World.

## THE SELF-CONTAINED MACHINE.

However well designed a manufacturing establishment may be, changes are almost constantly going on as more recent improvements are incorporated with the original plant. Considering this certainty, much more valuable and satisfactory is the self-contained machine which may be readily shifted from place to place and do its work as well when located but temporarily as when all the precautions are observed for an indefinite operation. We illustrate from a photograph a combination of such machines at the works of the Laurel Hill Chemical Co., Laurel Hill, L. I. Two timbers laid upon the ground and braces by strut pieces from the ceiling form the bed of the outfit, which consists of a 25 H. P. Westinghouse engine driving a salt cake crusher and grinder. Each machine is complete in itself and independent of its surroundings, and the engine easily runs with perfect safety at a speed of 400 revolutions per minute on its slender foundation. It may be interesting to note in this connection the extremes of speed in the power and its application. While the plant is not intended as a permanent one, the character of the production is no different from what could be obtained under more favorable conditions, and each machine yields as a whole to the inequalities of the foundation with no undue tendency to strain or warp the working parts.



THE SELF-CONTAINED MACHINE.

### Steel Ties in India.

With the relaying of the Prome (Burma State) line, the new steel trough sleeper is superseding the time honored timber sleeper in certain parts. These sleepers are certainly the best type of metal sleepers yet introduced. It has no tie rods to break or loosen from wear and tear, no cotters to work loose and fall out, there being no chairs and spikes to be removed, which for the new flanged rails, are still required when timber sleepers are used. With all these advantages, timber sleepers cannot be discarded altogether, as for all points and crossings where greater lengths are required timber sleepers must be used.—[Indian Engineering.

## LAKE SUPERIOR MINING NOTES.

The Horton Iron Co. has been organized with a capital stock of $500,000. The incorporators are R. H. Harris, R. P. Edson, H. B. Moore and W. G. Horton, of Mayville, N. D. The company's property is located in 3, 63-12, Eastern Vermilion.—[Vermilion Iron Journal.

The Chicago Iron Co was recently organized. The capital stock is $5 000,000 and the property comprises nineteen "40's" in 58-16 and 59-16. The officers are: President and General Manager, O. D. Kinney; Vice-President, A. E. Humphreys; Secretary, Frank Cox; Treasurer, J. T. Hale. The directors are O. D. Kinney, A. E. Humphreys, J. T. Hale, John McKinley, James Billings and E. C. Girdley. Capt. Florida, an old expert from the Gogebic range, and two assistants will have charge of the developments, and work will soon be commenced.—[Vermilion Iron Journal.

The Charleston Mining Co. has been organized by A. E. Humphreys, Frank Woodman, John McKinley and William McKinley. The property controlled by the company will be the e½ of se¼ of section 33, 59-18. The property is a strip three-fourths of a mile long, running north and south, and is next to that of the Mountain Iron Co. The company will be capitalized at $1,250,000, of which $250,000 will be set aside as treasury stock for purposes of development.—[Vermilion Iron Journal.

The situation at the Ludington mine is practically unchanged. The water is eight or ten feet below the 7th level, but is not lowered materially. A slight gain is made when everything works smoothly, but these gains are lost by the necessary frequent stoppages to repair some part of the machinery. The large Worthington pump that did duty for some time in No. 1 shaft of the Hamilton has been secured, and will be lowered to the sixth level in A shaft of the Ludington, and when it is in place with another pump below to throw water to it, the pumping capacity will be increased 500 gallons per minute, and then we may expect to see the water steadily lowered. From 80 to 100 tons of ore a day are being hoisted from the seventh level.—[Iron Range, Iron Mountain, Mich.

From Major M. W. Burt we learn that the Mt. Hope mine, more familiarly known as the Iron King, and the old Bonnie property will together hereafter be known as the Newport, being operated by the Newport Mining Co, Major Burt will still continue in charge of the mining operations which will be carried on with a vigor commensurate with the demand for ore. The same parties, or substantially the same, also now have charge of the property formerly known as the Blue Jacket, but hereafter to be known as the Royal. Some exploratory work will be entered upon at once on this property, which certainly would appear to have a most favorable location for a good deposit of ore. By way of a beginning, one of the old shafts will be unwatered and sunk deeper, or crosscuts run in from it, according as indications may suggest.—[Pick and Axe, Bessemer, Mich.

The Hollister mine, which is located in the west half of the south quarter of section 13, 42-32, five miles east of Crystal Falls, has started operations and is under the management of Edward Lobb, of Negaunee. Capt. James Cundy, of this city, is in charge of mining operations at the mine and, being a man of much experience is doing good work. The ore formation runs north and south, and so far as can be ascertained, it pitches to the north and dips to the west. The ore is good in Bessemer limits. Thus far two levels have been opened up in No. 2 shaft and No. 1 shaft is down to the first level where ore is now being mined. By the first of May it is expected that four levels will be in operation in No. 2 shaft. The shaft is vertical and is half in ore, and as the dip of the ore is about 80°, the shaft will be bottomed in ore in a short time. At present the mine is employing about 30 men, but the force is being increased as rapidly as possible. The mine location is situated in a very beautiful place surrounded by a grove of fine maple trees, which protect the houses from the cold winds.—[Tribune, Iron Mountain, Mich.

Active mining operations will be resumed at the Buckeye on Monday next. Superintendent John Doherty arrived here early in the week with a fine new No. 8 Cameron pump, and the work of unwatering the shaft was commenced on Wednesday and completed to-day. The shaft is down 107 feet. Crosscutting was commenced several months ago at a depth of 100 feet in a southerly direction, and continued for a distance of about 65 feet. An eight-foot ore vein was encountered four feet from the shaft, and after passing through four feet of mixed ore and quartz a small four-foot vein was crossed, the remainder of the 65 feet being in mixed ore. Another drift was started to the north and carried on for a distance of 55 feet, in mixed ore all the way, when the footwall was struck, the wall being composed of black slates, similar in character to that of the Badger, which is situated about a mile and a quarter due east. The company temporarily abandoned the old shaft last Fall, and began working upon the hill, some little distance to the south. The results were encouraging, but the company now deems it wise to continue exploratory operations at the older workings for the present. The shaft will be sunk to a depth of 175 or 180 feet and will again crosscut to the south, with the expectation of striking the true vein. If necessary the shaft will be sunk to a depth of 200 feet and another crosscut started. Sinking will be resumed on Monday with a force of six men, which will shortly be increased to twelve men. All indications point to the existence of a big body of ore upon the Buckeye property, and there is little doubt it will be found in the very near future.—[Mining News, Florence, Wis., February 5th.

A letter from Two Harbors, Minn., February 2d, says: This year's mining at the Vermilion range iron mines, owned largely by the Illinois Steel Co., will be on a greater scale than ever before. It is intended to mine 600,000 gross tons at the workings of the Minnesota Iron Co. and at the Chandler mine, now also in the same ownership, 500,000 tons will be mined. This is 360,000 tons more than these properties ever produced in a single year. The Pioneer mine, also owned by the Illinois Steel Co. and allied interests, will this year produce 50,000 tons. It has never yet produced any quantity of ore. The Zenith, lying beside the Pioneer, but owned in Duluth, will this year ship 50,000 to 75,000 tons, making the ore to be handled by the Duluth & Iron Range road for the year fully 1,200,000 tons. For this increase in its business the Iron Range is building a new ore dock. It is to cost $125,000 and will be ready in May. The Minnesota Steamship Co., also controlled by the same parties as the Illinois Steel Co., the Minnesota & Chandler Iron Co. and the Duluth & Iron Range Railway, forming the most gigantic mining and manufacturing corporation of the age, is building two 5,000-ton steamships, which will be added to its present fleet of six at the opening of navigation. These two boats will be the largest steam vessels on the lakes, and will be engaged exclusively in the ore trade, between Two Harbors, Chicago and Cleveland. Two whaleback ships are also being built by Capt. McDougall, at Superior, Wis., who is shipping agent for the Minnesota Iron Co. These will be practically a part of the fleet, and will give a tonnage capacity of 30,000 capable of moving 600,000 tons of ore in the season.

## THE DIXIE BLOWER.

The annexed cut represents a combined Dixie blower, engine and base frame, manufactured by the Huyett & Smith Manufacturing Co., of Detroit, Mich., which is used for blasting cupolas, forge fires, heating furnaces, boilers, etc. This combination makes a complete plant, belted up and shipped ready for steam connections and use, and is very desirable where power cannot be readily obtained or spared from the factory shafting or engine, as the combination can readily be placed in the position most desired near to the work required of it. These engines are constructed with a view to simplicity,

economy, strength, durability and high speed, having two band balance pulleys, of extra strength, which are belted direct to the blower. The base frame, on which the engine and boiler are fastened, is constructed of wrought iron angle beams securely bolted at corners and with holes drilled for anchor bolts or lag screws. The blower is of the well-known "Dixie" pattern, constructed by the Huyett & Smith Manufacturing Co., with feet on all four quarters of its case, so that it can be placed to discharge in any direction, vertically or horizontally, and is secured to the base frame by gibbed ways. It is adjustable, forward or back, by means of a screw to which the hand-wheel, shown beneath the blower, is attached, thus permitting the use of endless belts, which may be tightened or slackened br turning the hand-wheel. These machines are built in various sizes and capacities to suit requirements, and each one is fully tested before leaving the factory and is guaranteed to be first-class in every particular.

### Plating Iron with Steel.

The plating of iron with nickel, at first attempted as an experiment, with no specially useful result, is now accomplished successfully by pressure between two rolls, at a welding heat, the welding being recovered from the clippings and shearings of the plates by the action of dilute sulphuric acid at a temperature of 55 degrees Cent. By this means the iron is dissolved and the nickel obtained in the form of thin sheets as it is melted upon the iron. According to the Australian journal which describes this unique process, the operation is complete when the evolution of hydrogen ceases, even fresh acid at the same temperature has practically no effect. But, though the separating of the two metals is thus apparently perfectly made, a curious fact is noted, namely, that when the residual nickel is subjected to examination, it is found to differ from its original composition, the amount of iron present being notably increased.

### An Aluminum Light.

M. Villon proposes, in the *Revue de Chimie Industrielle*, to replace the magnesium light, now so extensively used for photographic purposes, by an aluminum light. Aluminum, he points out, costs only one-third as much as magnesium, and burns in much the same manner as the latter metal, only more slowly. In the oxyhydrogen flame it burns with an intense light without producing smoke, which is a most important feature, and which is held to constitute a great advantage over magnesium.

## AN IMPROVED ROLLING MILL.

Julian Kennedy, of Pittsburgh, has invented a new and useful improvement in rolling mills, of which the following is a description, reference being had to the accompanying drawings, in which Fig. 1 is a plan view of this improved rolling mill. Fig. 2 is a side elevation thereof, partly in vertical central section. Fig. 3 is an end elevation, and Fig. 4 is a vertical section on the line IV IV of Fig. 2. Mr. Kennedy, thus describes his invention:

My invention has for its object to improve the construction of upright rolls of a universal rolling mill and to provide mechanism of great strength and compactness, easy to set and to maintain in working order, and more effective in operation than other rolls heretofore known. In the drawings, 2 2 represent the housings or end frames within which the rolls are set and which are secured at their bases to foundation-shoes 4, and 3 is the main driving-shaft, journaled in suitable bearing therein. The bearings of the rolls are confined and guided in their adjustment by parallel upper and lower guide bars arranged between the housings. The lower guide bars 5, which are or may be square in cross-section, rest upon seats or shoulders 6, formed on the inner opposite sides of the housings and are held thereto by link-bolts 7, whose inner ends have eyes or links fitting upon pins or bolts 8, which extend transversely through the bars, while the outer ends extend through the housings and are held by nuts 9. The two lower guide bars are connected at their ends by bolts 10, and at points intermediate of their length are supported by cross-beams or blocks, 11. The upper guide bars 12, which are hollow longitudinally, are supported on shoulders 13 on the inner sides of the housings and are held firmly thereto by long bolts, 14, which extend through the guide bars and through the housings and at their end are provided with nuts 14′. The guide bars are tied together at the ends by cross-bolts 15 and at the middle by bolts 16 and a separating block 17. The shape in cross section of the upper guide bars is shown in Fig. 4, each having a strong body portion and on the inner side a longitudinally grooved flange or seat, 18, by which flanges on the roll-bearings are upheld and guided. The ends of the upper and lower guide bars bear against the housings, and when the connecting bolts are drawn tight the guide bars thus act as separating pieces or struts for the housings, enabling them to be held as a firm, substantial, and self-contained structure. Especially is this so with respect to the action of the guide bars as used in connection with the long connecting bolts.

There are two working rolls 19 19 employed in the apparatus and two driving-rolls 19′ 19′, situated on the outer sides of the working rolls and geared thereto. The bearing-blocks 20 of each pair of these rolls are made in vertically divided sections, which are fitted around the roll journals between the guide bars and have flanges which fit on the guide bars and support the bearings. The adjacent bearing sections are securely bolted together by bolts, which also secure them to the respective ends of an upright carrier or frame 22, and this likewise fits between and is supported by the guide bars. The lateral adjustment of these carriers and the consequent adjustment of the rolls carried thereby is had by means of adjusting-screws 23, which pass through nuts in the housings and bear on the carriers, being adapted when driven to move the carriers inwardly, and by counterbalancing cylinders 24, set in the housings and having their pistons connected with the carriers, an outwardly acting water-pressure is exerted (preferably constantly) on these pistons, so that when the motion of the adjusting-screws is reversed the carriers will be retracted by the counterbalancing water-pressure. 25 25 are the usual gear-wheels and shaft by which all the adjusting-screws are connected. They are driven by a suitable motor. (Not shown.)

The upper necks of the working rolls terminate, preferably, at or about the level of the upper guide bars; but the neck of each of the outer rolls extends upwardly nearly to the shaft 3, and above the guide bars is fitted with

*Fig. 1.*

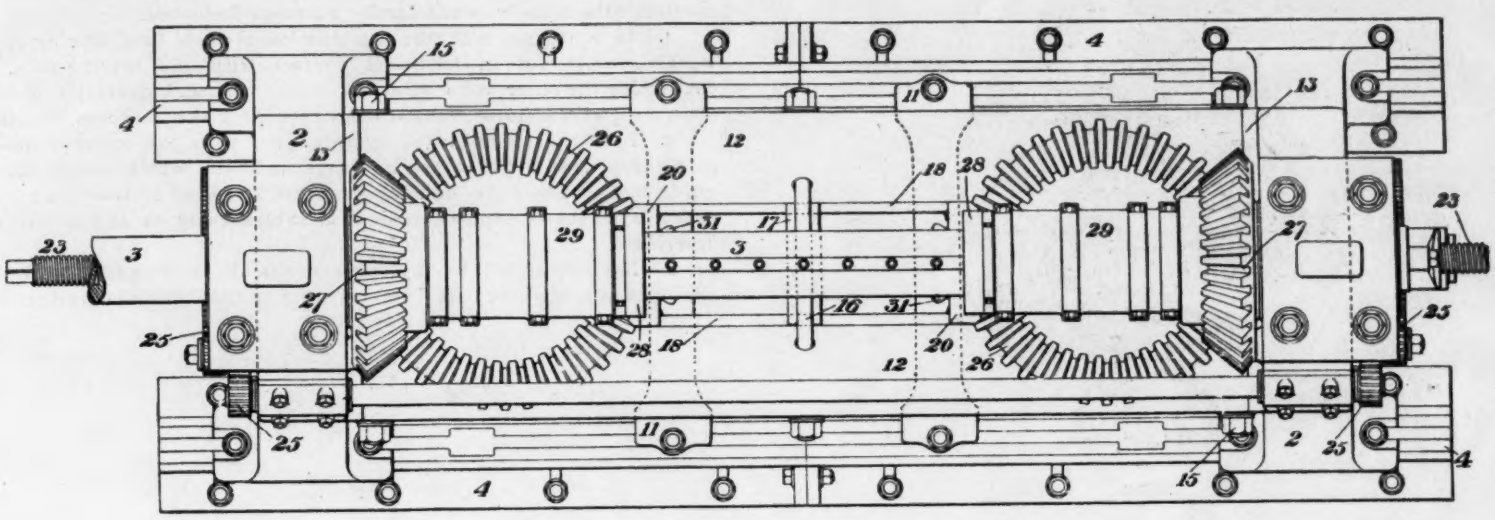
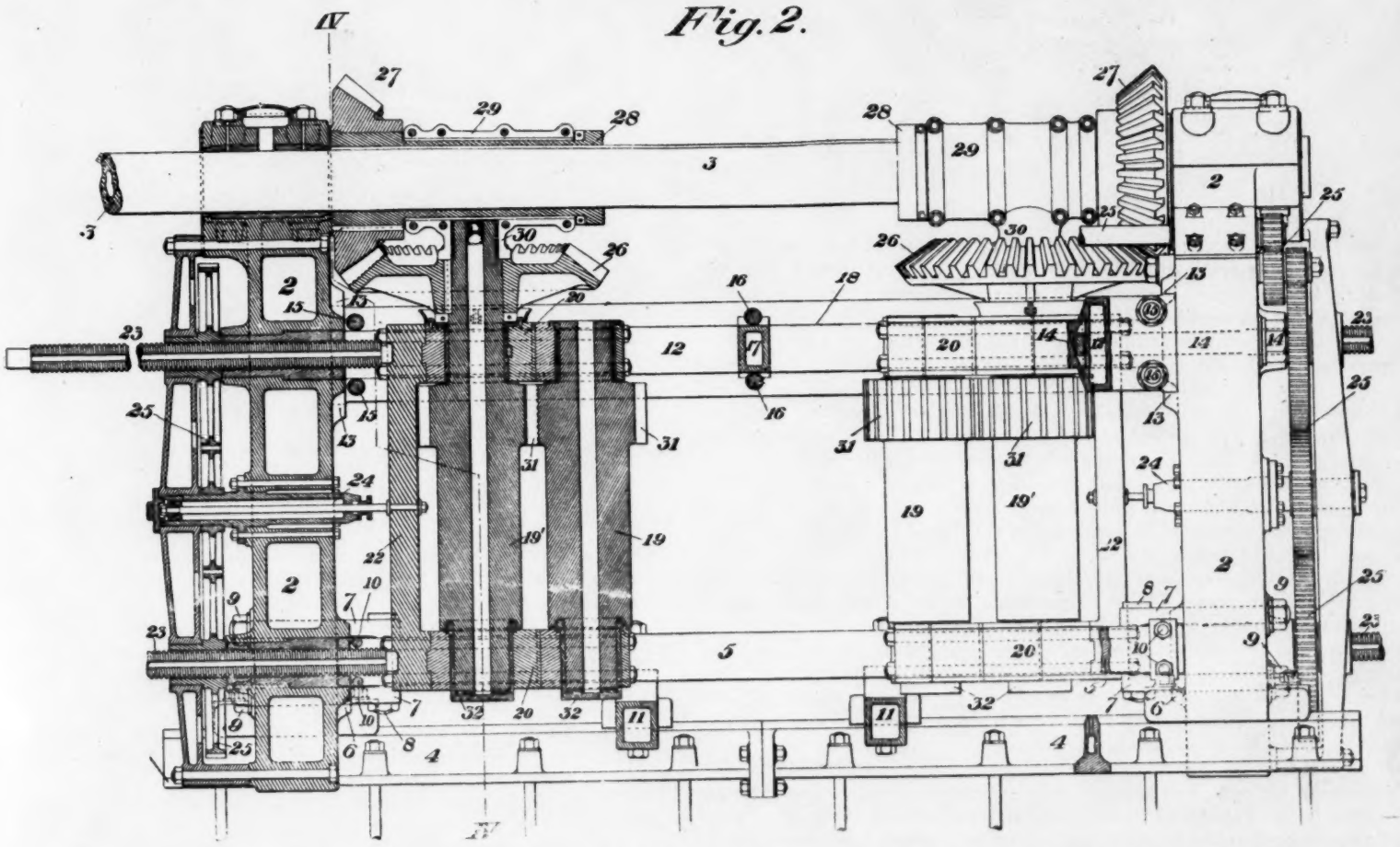


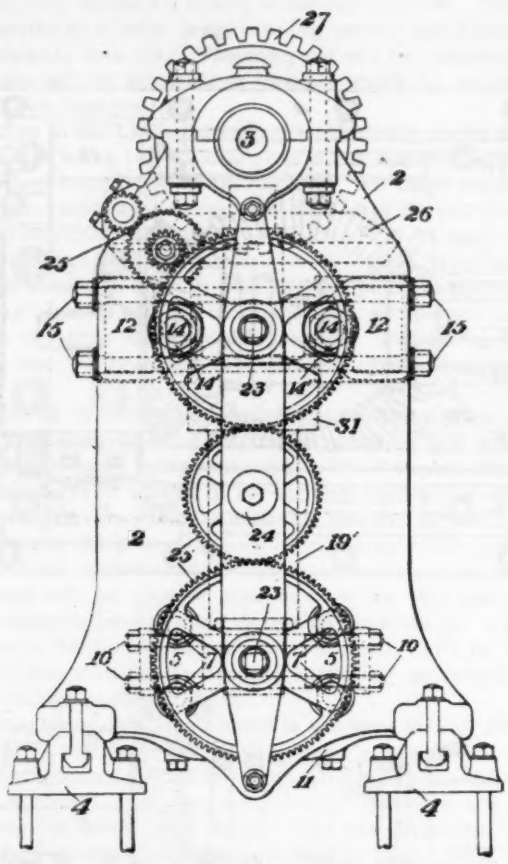
*Fig. 2.*



a bevel gear-wheel 26, whose teeth mesh with the teeth of a bevel pinion 27, keyed to an ordinary elongated hub 28, which is set with a feather and spline or other traveling connection on the driving-shaft 3. 29 is a sectional collar which encircles the hub 28 loosely, and which has a bearing-socket 30, in which the end of the neck of the roll is fitted. As the rolls are adjusted laterally with their carriers, the neck of each roll 19′, acting on the collar, moves the hub 28 along the driving-shaft and maintains the latter in constant power connection with the roll.

Each working roll is connected with its adjacent driving-roll by encircling gear-teeth 31, which are formed integral with or are suitably attached to the rolls, preferably below the upper guide-bars. The bodies of the rolls are

*Fig. 3.*




thus somewhat separated; but as they are positively geared together the rotation of the driving-rolls will drive the working rolls uniformly and with certainty. In this respect my improved apparatus is greatly superior to prior devices in which the working rolls are driven merely by frictional contact with the others, for in such case in the event of the application of heavy work to the working rolls the driving-rolls are apt to slip, thus not only wearing the rolls injuriously, but tending to cause the opposite working rolls to act with lack of uniformity. This is avoided by gearing the rolls together, since the action is thus made positive and necessarily uniform. It is also better than other prior devices where the driving-roll in frictional contact with the working roll, as above explained, is also connected therewith by gearing, since by my arrangement, in which the rolls are separated, I can use larger gearing. When the rolls are connected by gearing and are also in frictional contact, any wear of the rolls will destroy the uniformity between the action of the gearing and the frictional driving, thus imparting to the gearing serious strain and wear, which are not present in my apparatus. A novel and advantageous feature of my apparatus is also the location of the connecting gearing of the rolls between the bearings—a place best adapted to securing the best condition of strength and effectiveness in transmission of power. In using the mill the rolls are driven by rotation of the driving-shaft 3, the piece to be rolled is passed between the working rolls 19, and the width of the pass is successively lessened by action of the adjusting mechanism in order to effect the desired reduction of the metal.

The reason for using two pairs of rolls—a working pair and a driving-pair—is that if but a single pair were used the gear-wheels 26 would prevent their being brought sufficiently close to roll metal of small dimensions unless such gear-wheels were made of unduly small diameter or the rolls made of unduly large diameter, either of which constructions would be disadvantageous.

Advantages of my improvement other than those already stated are as follows: By reason of the construction of the rolls and lower guide bars either of the driving rolls can be removed simply by disengaging the bearing-sections, freeing one of the lower guide bars and removing it laterally, removing the upper guide bar, and taking out the roll. The inner rolls can be removed by disconnecting the bearing-sections and dropping the rolls through a window or enlarged space formed at the middle of the lower guide bars. If desired to use the mill for rolling wide pieces, the inner rolls can be removed thus, and the outer rolls used as the working rolls. Setting the guide bars on seats on the housings and securing them thereto renders them easy to be removed and replaced by disengagement of the securing-bolts. I believe I am the first to set the guide bars so that they shall be removable laterally. The connection of the housings by the long bolts which extend through the upper guide bars is also of advantage in that it is a compact arrangement, and enhances greatly the strength of the mill. The same device may be applied to the lower guide-bars, if deemed desirable.

The novel features of my invention are recited in the following claims, each of which states an item of invention unqualified by the limitations and elements not expressed therein, though stated in other claims.

1. In a rolling mill, the combination of driving-rolls, inner working rolls which are connected therewith by gearing and whose bodies are separated from the driving-rolls, and means for adjusting the rolls laterally, substantially as and for the purposes described.

2. In a rolling mill, the combination of guide bars, driving-rolls, and inner working rolls connected therewith by gearing situate on the inner side of the guide bars, and means for driving the first-named rolls, and means for adjusting the rolls, substantially as and for the purposes described.

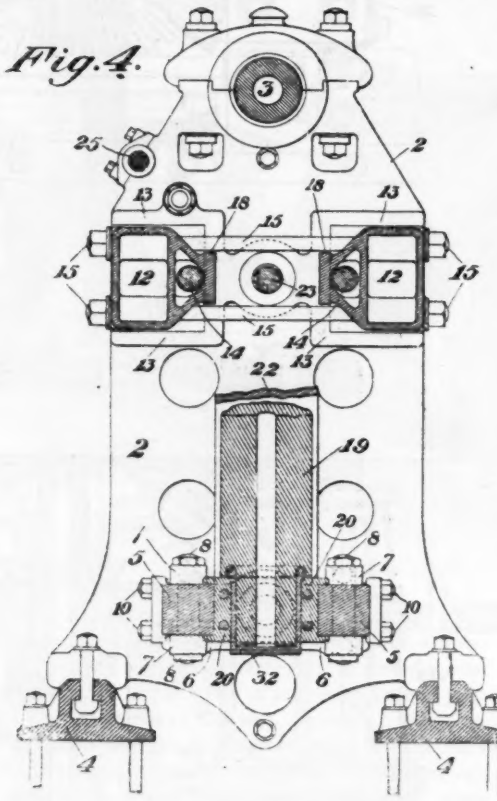
3. In a rolling mill, the combination of guide bars, driving-rolls, and inner working rolls connected therewith by gearing situate on the inner side of the guide bars, a power shaft, and gearing situate on the outer side of the guide bars and connecting the driving-rolls with the shaft by a traveling connection, substantially as and for the purposes described.

4. In a rolling mill, the combination of guide bars, driving-rolls, inner working rolls not in frictional contact with the driving-rolls, gearing connecting the outer rolls with the inner rolls, and gearing connecting the outer rolls with a motor, substantially as and for the purposes described.

5. In a rolling mill, the combination, with the opposite housings, of guide bars, fitted between the housings, and bolts which extend through the guide bars, connect the housings, and are arranged to draw the housings together upon the interposed guide bars, substantially as and for the purposes described.

6. In a rolling mill having vertical rolls, the combination, with the opposite housings, of guide bars fitted on seats on the housings, having their ends

*Fig. 4.*




bearing against the housings and removable laterally therefrom, roll-bearings set movably between the guide bars, and means for securing the guide bars, substanially as and for the purposes described.

7. In a rolling mill having vertical rolls, the combination, with the opposite housings, of guide bars extending between the housings, and link-bolts extending through the housings, and pins on the guide bars to which the link-bolts are fitted, substantially as and for the purposes described.

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### Chrome-Nickel Steel for Armor Plates.

The *Compagnie des Hauts-Fourneaux, Forges et Acieries de la Marine et des Chemins de Fer* is experimenting with a new alloy for armor plates, projectiles and guns, viz., a steel containing one per cent. of chromium, two per cent. of nickel, and not more than 0 4 per cent. of carbon, the steel is first melted in an open hearth, and in the ordinary way. When the silicon and manganese in the metal have attained their proper proportions the nickel and chromium are added successively in the form of ferro-nickels and ferro-chromes, or in the shape of a double ferro-chrome and nickel.

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A POWDER for use in coating the interior of steel and other molds has been patented by Mr. D. Stephens, says the *Engineer*. A silicious rock known as "Dinas" silica stone, and containing about 98 per cent. of silica, 1 per cent. of alumina, 0 5 per cent. of oxide of iron, and 0 5 per cent. of lime, is washed and calcined. The stone is then ground until of the consistency of wheat flour, contact with metal being avoided in the grinding. Sometimes 0.5 per cent. of aluminous clay is added. The above powder is mixed with water or sour beer and used as a lining for steel or other molds. It is preferably toughened by coating with tar and firing. When used for green mold steel castings the powder is dusted on the mold out of a coarse bag.

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## INDUSTRIAL SUMMARY.

New Enterprises:—

The following recent incorporations, specially reported for *The Iron Trade Review*, are of interest to the iron and machinery trade:

Moline, Ill.—Acme Machine Co; capital, $10,000; to manufacture, vend and deal in machinery and novelties; incorporators: Stephen A. Walter, C. E. Grantz, E. B. Atkinson, Rufus A Smith.

Brooklyn, N Y.—The Wallace & Nostrand Co; capital, $100,000; for the manufacture and sale of tinplate; incorporators: John Wallace, Chas. Nostrand, both of 329 Myrtle avenue, Brooklyn, N. Y.

Decatur, Ill.—The Decatur Manufacturing Co; capital, $1,200; for the general manufacture and sale of mechanical devices and appliances; incorporators: John H. Culver, Edwin T. Coleman, Elmer E. Gibson.

Monroe, Mich.—Wright Brothers Manufacturing Co; capital, $20,000; for the manufacture and sale of agricultural implements, etc.; incorporators: Wm. S. Wright, Albert G. Wright, Horace M. Wright, all of Toledo, O.

Dubuque, Ia.—Dubuque Ore Concentrating Co.; capital, $25,000; for the purpose of buying, selling, concentrating, reducing and shipping ores; L. A. Rhamberg, Jos. Fruib, F. W. Altman, Philip Pier, J. S. Southwell, Dubuque, Ia.

Chicago, Ill.—Chicago Meat Chopper Co; capital, $10,000; to manufacture, sell and deal in meat choppers, grant licenses for use thereof, and do all such other business incidental thereto; incorporators: Geo. E. Caughey, Michael J. Gleason, Felix Anerbach.

Buffalo, N. Y.—The Niagara Railway Equipment Co; capital, $10,000; for the purpose of manufacturing, buying and selling articles required in railway equipment; incorporators: Jas. F. Gluck, Chas. Pooley, C. N. Willard, all of 24 W. Seneca street, Buffalo, N. Y.

Clinton, Ia.—Clinton Bridge & Iron Works, Clinton, Ia.; capital, $50,000; to build, manufacture, erect and repair bridges; a general manufacturing contracting machinery; incorporators: Geo. E. Wilson, C. C. Keepers, A. W. Borkel, E. A. Arlen, James Dempsey, Clinton, Ia.

Chicago, Ill.—The Traffic Construction Co., Chicago, Ill; capital, $500,000; for the construction of all kinds of railroads, ferries, bridges and other highways, or means for transporting of freight and passengers, etc; incorporators: Norman W. Gifford, Wm. E. Shaw, Jas. F. Stephens.

Chicago, Ill.—Patton Vitrified Brick Co.; capital, $50,000; to manufacture, buy, sell and deal in brick, tile, sewer-pipe and terra-cotta of all kinds, and do general manufacturing business; bore for and sell gas, oil and other mineral products; incorporators, Eugene H. Dupee, Geo. G. Patton, Henry M. Wolf.

Cleveland, O.—The Durand Manufacturing Co; capital, $20,000; for the purpose of manufacturing, selling, dealing in all kinds of gas, oil, vapor and heating stoves, cooking utensils, tools, light machinery and materials, etc.; incorporators: Frank S. Durand, F. Skeels, Chas. A. Bejeck, Delos Cook, A. W. Barber.

East St. Louis, Ill.—The Queen City Silver & Nickel Plating Co; capital, $25,000; for the manufacture and sale of plating outfits and materials in general for gold, silver, nickel, brass and copper plating, and for a general plating business; incorporators: Geo. H. Grondenberg, Hedley J. Richards, Austin G. McDonnell.

New York City, N. Y.—The Chapman Derrick & Wrecking Co. (incorporated in W. Va.); capital, $300,000; for the purpose of constructing, owning and operating machines for the raising of vessels and other heavy bodies, etc.; incorporators: Wm. E. Chapman, Isaac E. Chapman, Wm. L Chapman, all of Brooklyn, N. Y.

Cleveland, O.—The H. B. Hunt Stamping Co. (incorporated in West Virginia); capital, $500,000; for the purpose of conducting a manufacturing establishment for the stamping of sheet metal, manufacturing dies, machinery, decorated ware, etc; incorporators: H. R. Hunt, Jas. T. Hunt, Geo. W. Johnson, all of Cleveland, O.

Chicago, Ill.—Colby Specialty Supply Co; capital, $100,000; for the purpose of inventing, manufacturing, selling, leasing and otherwise operating various electrical and mechanical devices, appliances and chemical products, sale and leasing territorial rights and United States and foreign letters patent; incorporators: Edward J. Colby, Albert J. Fisher, Harry Fox.

Leavenworth, Kas.—The Leavenworth Power Co. (incorporated in W. Va); capital, $500,000; for the purpose of manufacturing, selling, leasing, etc., all kinds of power and machinery and for generally carrying on every kind of mechanical business; incorporators: J. S. Clarkson, New York City, N. Y; L. T. Mechner, Shelbyville, Ind.; P. W. Holmes, Washington, D. C.

OTHER NEW ENTERPRISES.

It is reported that the Ford Boiler Cleaner Co, of Norristown, Pa., will establish a plant at that point.

A new Boston (Mass.) concern is the Wrought Iron Casting Co, of which G. D. Sargent is President. The capital is $25,000.

The Columbian Palace Car Co., of Chicago, has been organized, with capital stock of $6,000,000, by M. H. Throop, Jr., A. C. Story and others.

The Mammoth Manufacturing Co., of Birmingham, Ala, capital, $1,750,000, has been incorporated, for the manufacture of agricultural implements.

The Purcell Bridge & Transfer Co., has been incorporated by E. J. Keller, A. R Garner and E. M. Abernathy, of Lexington, Oklahoma, with a capital of $50,000.

The State American Construction Co., of New York, has been incorporated by A. Steer and others, to construct buildings, bridges, etc. Capital stock $50,000.

A charter has been granted the United Steel Co., of Pittsburgh, Pa. The directors are E. W. Smith, E. W. Beach, C. A. Crawford and others. Capital stock $250,000.

The Bain Manufacturing Co. is a new organization at Bridgeport, Ala., which is considering the establishment of a plant for the manufacture of wrought-iron fencing.

The Henry Dalton & Sons Co. have filed articles of incorporation at Oakland, Cal. The capital stock is $100,000 and the purpose is to conduct foundry and machine shops, etc.

Charles Robson, J. M. Potter, P. W. Hardin and others have incorporated the Harris Gas Co. to erect and operate gas works, etc, at Newport, Ky. The capital stock is $5,000,000.

The National Electric Protection Co. has been incorporated at Memphis, Tenn., to manufacture and sell electric circuit protectors. E. L. McGowan, John S. Toof, Frank Ozanne are the incorporators.

The Souder Railway Freight Car Co. has been incorporated at Newport, Ky, by John Smay and others, to manufacture freight cars under the patent of Jacob Souder, of Washington, D. C. The capital is $2,000,000.

The Holt Manufacturing Co., of Stockton, Cal., has been organized to manufacture cars by C. H. Holt, and F. S. Holt, of San Francisco, Benj. Holt, G. H. Cowis and Geo. Dickenson, of Stockton; capital stock, $500,000.

The Kinsman Block System Co., of Plainfield, N. J., has been organized with $2,000,000 capital stock. The incorporators are F. E. Kinsman and E. C. Perkins, of Plainfield, N. J; W. C. Fisk, of Wilburtha, N. J, and others.

The Columbia Car & Tool Works, at Portland, Ore, has been formed for the manufacture and sale of machinery, cars, etc.; capital stock, $100,000. Henry Halen, H. H. Lovejoy, Leo Fried, and Maurel Heacock are the promoters of the project.

The Thayer Water Gas Furnace Co., of Pittsburgh, Pa., have been chartered, with a capital stock of $5,000. The following are the incorporators of the new concern: Wm. C. Thayer, Jno. Oakley, Thad. Summer, Jno. D. Armstrong, Robert D. King and Edward B. Scull.

The Lawson Non-Explosive Boiler Co, of Columbus, O, has been organized for the purpose of manufacturing steam boilers and other machinery. A. H. McAlpin, Wm. Felton, H. A Axline, Chas. G. Lord, J. C. Taylor, D. T. Lawson, S. B. Campbell are the incorporators. The capital stock is $300,000.

Articles of incorporation have been filed by the Thatcher Manufacturing Co., of Kansas City, Mo., with a stated capital of $100,000, divided in 1,000 shares at $100 each. The new company are formed for the purpose of operating the Thatcher hot-water and steam boiler patents, and have bought the plant and buildings erected for the Kansas City Radiator Co. Work will commence in a short time.

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Additions, Enlargements, Removals, Etc.:—

C. P. Hutchins is enlarging his machine plant at Freedom, Me.

The Ramapo (N. Y) Iron Co. is erecting another large building.

Pope, Harris & Co. will erect a shingle mill at East Machias, Me.

The B., B. & K. machine shops at Bradford, Pa., are being rebuilt.

The Wiregrass Construction Co. will erect steam mills at Macon, Ga.

Land has been purchased at Buffalo, N. Y., by President Hayes, of the Buf-

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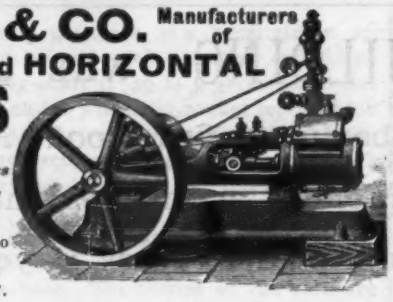

falo Cast Iron Pipe Co., on which he will erect a new pipe works with a capacity of 60 tons a day.

The Gilbert Car Works, Green Island, Troy, N. Y., are to be enlarged.

The Reliance Wire Works Co. is to erect a new plant at Milwaukee, Wis.

The capacity of the Ball Engine Co., Erie, Pa., will be increased by building additions.

A machine shop is reported as to be erected at the Colored State Agricultural and Mechanical College, at Raleigh, N. C.

The Lima Machine Works, of Lima, O., is said to be considering the removal of its machine works to Chattanooga, Tenn.

It is stated that the Stonemetz Printing Machine Co., of Millbury, Mass., is to remove its plant to Brooklyn, N. Y., in the Spring.

J. H. Cole, of Parkersburg, W. Va., is investigating with a view of removing his iron foundry, machine shop and boiler works to Bridgeport, Ala.

The Lowell & Suburban Street Railway Co. is to erect an electric power plant in Middlesex Village, Mass. The building will be 180x130 feet, and 26 feet high. The power of the plant will be 1,500 horse-power, with arrangements to increase to 2,500 if necessary.

Fires and Accidents:—

The machine shops of W. J. Cooker & Brother, Dublin, Ga., were destroyed by fire recently; loss, $11,000; insurance, $5,000.

The roundhouse and machine shop of the New Orleans & Southern Railroad, near New Orleans, La., have been destroyed by fire; loss, $60,000.

The plant of the Munn Machine Works, of New Brunswick, N J., was totally destroyed by fire on the 24th ult. Loss on buildings and machinery about $50,000; partially insured.

General Industrial Notes:—

The Union Rolling Mill Co, of Cleveland, O., is erecting six Babcock & Wilcox steam boilers to utilized the waste heat of their puddling and scrap furnaces.

The firm of Bishop & Murphy, Cincinnati, having been dissolved, its business will be Thos. F. Bishop, who will continue on at the old stand, No. 211 East Pearl street.

Mr. H. A. Kerkhoff, for so many years with the Bickford Drill Co., Cincinnati, O., has started in business corner Western avenue and Dayton street, Cincinnati, O., as a maker of upright and radial drills and machine tools, under name of A. H. Kerkhoff & Co.

James Montgomery's Erie Street Iron Foundry, of Jersey City, has been enlarged by an addition of 55x100 feet, and has been put in a stock company with paid in cash capital of $15,000, and to be known as the Erie Street Iron Foundry Co., James Montgomery, Manager.

Sealed proposals will be received at the office of the Supervising Architect, Treasury Department, Washington, D. C., until two o'clock P. M., on the 24th day of February, 1892, for all the labor and materials required and fixing in place complete the low-pressure, return circulation, steam heating and ventilating apparatus for the United States Post Office building at Watertown, New York.

Sealed proposals will be received at the office of the Supervising Architect, Treasury Department, Washington, D. C., until two o'clock P. M., on the 25th day of February, 1892, for furnishing and erecting complete the hydraulic passenger elevator, including pump, tanks, piping, car, etc., and the construction of well hole for said elevator, for the United States Custom House Building at Cairo, Ill.

Sealed proposals will be received at the office of the Supervising Architect, Treasury Department, Washington, D. C., until two o'clock P. M., on the 29th day of February, 1892, for furnishing all the labor and materials required and fixing in place complete, the low-pressure, return-circulation, steam-heating and ventilating apparatus (or otherwise, as the case may be) for the United States Post Office Building at Lancaster, Pa.

The Card Electric Motor & Dynamo Co. have been carrying on business for some years, and have for some time been located at the southeast corner of Second and Plum streets, Cincinnati, O. Within a few months the company has been reorganized under the laws of Ohio, with a capital of $100,000, with the following officers: J. V. Wilshire, President; George Bullock, Vice President; C. B. Sinorall, Secretary; O. W. Jantz, Superintendent and Electrician. While December and January have been somewhat dull months among manufacturers in Cincinnati, and more or less in all the places, all things considered, this company have been doing a very fair business, and so far as can see and judge, think the prospects are favorable for a very good year's business. In the issue of *The Iron Trade Review* of December 18th, 1890, was an illustrated article calling attention to a type of motor made by this company, of from eight to 30 H. P., or dynamos from 100 to 350 lights They claimed that it was considered very efficient and economical in use, simple in its construction, and strong and durable in its arrangements, thus putting the strength where most needed. This company sought to profit from the experience of others, and in so doing offer to all, as they think and feel, one of the most perfect, complete and easily worked dynamos known of or for sale in the market; and as is being used extensively and demand for same increasing as the machine is being more used and known, is good indication of its value. Anyone needing anything of the kind or intending to make use of electrical machinery for any purpose, will find it well to write to this company for more full particulars of this or other articles made by them. J. P. G.

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SPECIAL TOOLS AND MACHINERY
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Gentlemen:-
In reference to the one hundred pound hammer that we have of your make we are glad to be able to state that same has given us very excellent results during the year that we have had it in use. We do a great variety of work on same and cheerfully recommend it especially where exact work is required.
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THE STANDARD TOOL C O.,
Genl. MGR.

## Alphabetical List of Advertisers

The star (*) indicates that the adv. appears alternate weeks; the dagger (†) once a month the double dagger (‡) once in three weeks.


| | PAGE |
|---|---|
| Aitchison, Rob't Perforated Metal Co | 15 |
| Adt, John & Son | 15 |
| †Armstrong Bros | — |
| American Bridge & Iron Co | 14 |
| Burton, W. J. & Co | 14 |
| Bischoff, F. F. & Co | 16 |
| *Berger Mfg. Co | — |
| Babcock & Wilcox Co | 20 |
| Buffalo Specialty Mfg. Co | 18 |
| †Butman Furnace Co | — |
| Barr Electric Mfg. Co | 17 |
| Cleveland City Forge & Iron Co | 20 |
| Cleveland Twist Drill Co | 20 |
| Cleveland Iron Mining Co | 13 |
| Cleveland Rolling Mill Co | 13-16 |
| Cleveland Desk Co | 13 |
| Condit Fuller Co | 13 |
| *Copeland & Bacon | — |
| Colliau, Victor | 18 |
| Canton Iron Foundry Co | 14 |
| Cambridge Roofing Co | 19 |
| Cole, J. Wendell | 20 |
| Chester Steel Casting Co | 12 |
| Corrigan, Ives & Co | 13 |
| Canton Saw Co., The | 20 |
| Deming Co | 18 |
| Dixon, Jos., Crucible Co | 15 |
| Downerd & Son Co., The J | 15 |
| Egan Co | 15 |
| Edison General Electric Co | 15 |
| Eberts Bros | 20 |
| Eclipse Electrotype & Engraving Co | 16 |
| Frank & Co | 18 |
| Fleharty, J. H & Co | 16 |
| Fitzgerald, W. T | 12 |
| Fellowes, Ernst T | — |
| Graham Twist Drill Co | 20 |
| Garvin Machine Co | 15 |
| *Garfield Injector Co | — |
| Garry Iron Roofing Co | 19 |
| Graves, L. S. & Son | 15 |
| Gerlach, Peter & Co | 13 |
| *Gillette & Lewis, | 15 |
| Hutchison, W. S | 20 |
| Harrington & King Perforating Co | 13 |
| *Hodell, H. H. & Co | 19 |
| Hartford Steam Boiler Insp. & Ins. Co | 16 |
| Hackney Hammer Co | 12 |
| Hartman Sliding Blind Co | 16 |
| Hercules Powder Co | 18 |
| Iron Clad Paint Co | 19 |
| Industry File Works | 20 |
| Jones, E. H. & Co | 18 |
| Jeffrey Mfg. Co | 14 |
| Jenks, James | 12 |
| Kanneberg Roofing Co | 19 |
| *Leffel, Jas. & Co | 19-12 |
| Ladd, Alfred W | 17 |
| Milton Mfg. Co | 15 |
| *Munn & Co | — |
| Michigan Emery Wheel Co | 17 |
| *Neracher Sprinkler Co | 10 |
| New Philadelphia Iron & Steel Co | 13 |
| Outhwaite, J. H. & Co | 13 |
| Oglebay, Norton & Co | 13 |
| Oldfield, L. H | 16 |
| Pope, E. C | 13 |
| Parkin & Bosworth Co | 20 |
| Palmer, Cunningham & Co | 14 |
| Pemberthy Injector Co | 20 |
| Pollock, Wm. B. & Co | 18 |
| Pratt Chuck Co, The | 18 |
| Rogers & Hubbard Co | 17 |
| Rowell, Geo. P. & Co | 15 |
| Reynolds Bros | 20 |
| Schleicher, Schumm & Co | 18 |
| Sykes Iron Roofing Co | 19 |
| Sackman, F. A | 14 |
| Southwark Foundry & Machine Co | 19 |
| Stirling Co | 18 |
| Stilwell & Bierce Mfg. Co | 20 |
| Spicer Mfg. Co | 15 |
| Shepard, H. L., Agent | 17 |
| Skinner Engine Co | 19 |
| Stevens, F. B | 19 |
| *Simpson, Thos. P | 16 |
| Sterling Grate-Bar Co | 14 |
| Toledo Machine & Tool Co | 18 |
| Tod, Wm. & Co | 18 |
| Totten & Hogg Iron & Steel Foundry Co | 12 |
| Van Duzen Gas Engine Co | 16 |
| Upson Nut Co | 16 |
| Union Electrotype Foundry | 14 |
| Universal Radial Drill Co | 20 |
| Unger & Wigham | 19 |
| Union Photo Engraving Co | 20 |
| West, Thos. D. Foundry Co | 14 |
| Westinghouse Machine Co | 19 |
| Wyckoff, Seamans & Benedict | 18 |


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True to pattern, sound, solid, free from blow-holes and of great strength.
Stronger and more durable than iron forgings in any position, or for any service whatever.
60,000 CRANK SHAFTS and 50,000 GEAR WHEELS of this steel, now running, prove this.
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For Sale.
1 Engine Lathe 25-inch Swing 14-foot Bed.
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1 Iron Planer 24" x 24" x 5'.
1 24 inch Back Geared Drill.
1 No. 4 Garvin Plain Milling Machine with Mandrels and Cutters.
1 Whiton Centering Machine.
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# IRON AND STEEL MARKETS.

## PIG IRON.

CLEVELAND (f. o. b. cars, net cash Bessemer, $15 70; No. 1 Foundry, $15 20; No. Foundry, $14 70; No. 1 Gray Forge, red short $14 20; No. 2 Gray Forge, neutral, $14 20; No. 1 American Scotch, $15 70; No. 2 American Scotch, $14 70.

CHICAGO (reported by Messrs. Rogers, Brown & Merwin): Southern Coke No. 1 foundry, $16 00 @16 75; Southern Coke No. 2 Foundry, $15 00 @15 75; Southern Coke No. 3 Foundry, $14 25 @15 00; Southern Coke No 1, Softeners, $15 00 @15 75; Southern Coke No. 2, Softeners, $14 25 @15 00; Ohio Silveries No. 1, $17 50@18 50; Ohio Silveries No. 2, $16 50@ 17 50; Ohio Strong Softeners No. 1, $18 00@19 00; Ohio Strong Softeners No. 2, $17 00@18 00; Lake Superior Charcoal Nos. 1 to 6, $17 00@18 00; Tennessee Charcoal No. 1, $1700@18 00; Tennessee Charcoal No. 2, $16 50@17 50; Southern Standard Car Wheel, $21 00@23 00; Tennessee Standard Car Wheel, $00 00@00 00.

CINCINNATI (reported by Rogers, Brown & Co.): FOUNDRY IRONS—Southern Coke, No. 1 foundry, $14 75@15 25; Southern coke, No. 2 and No. 1 soft, $13 75@$14 20; Hanging Rock Coke, No. 1 foundry, $16 50@17 00; Jackson Co. Stone Coal, No. 1 foundry, $16 50@17 00; Tennessee Charcoal, No. 1 foundry, $17 00@17 50; Hanging Rock Charcoal, No. 1 foundry, $19 75 @21 00. MILL IRONS—Standard Southern Coke, grey forge, $12 50@12 75; Standard Southern Coke, mottled, $12 25@12 50; Cold Short Southern Coke, grey forge, $12 75@13 00; Strong Ohio Neutral Coke, grey forge, $15 00@15 50. CAR WHEEL AND MALLEABLE—Standard Alabama Car Wheel, $19 00@20 00; Tennessee Car Wheel, $18 00@19 00; Lake Superior Car Wheel, $19 50@20 50.

BUFFALO (reported by Rogers, Brown & Co.): Mahoning and Shenango Valley strong, No. 1 Foundry, $16 00@00 00; Mahoning and Shenango Valley strong, No. 2 Foundry, $15 00 @00 00; Ohio Softener No. 1, $16 20@00 00; Ohio Softener No. 2, $15 20@00 00; Jackson Co., Silvery No. 1, $18 00@00 00; Jackson Co. Silvery, No. 2, $17 00@00 00; Lake Superior Charcoal, $18 50@00 00; Tennessee Charcoal, $18 25@00 00; Southern Softener No. 1, $15 75@00 00; Southern Softener No. 2, $15 00@00 00; Southern Strong No. 1 Foundry, $16 75@00 00; Southern Strong No. 2 Foundry, $15 00@00 00' Alabama Car Wheel, $19 75@20 75; Hanging Rock Charcoal, $21 00@22 00.

LOUISVILLE (reported by Hall Bros. & Co.) HOT BLAST FOUNDRY—Southern coke No. 1, $14 00@14 50; Southern coke No. 2, $13 00@13 50; Southern coke No. 3, $12 50@12 75; Mahoning Valley (Lake ore mixtures), $00 00 00@00 Southern charcoal, No. 1 $15 75@16 75; Southern charcoal, No. 2, $15 50@16 00; Missouri charcoal, No. 1, $17 00@17 50; Missouri charcoal, No. 2, $16 50@17 00. FORGE—Neutral coke, $12 50@12 75; Cold short, $12 25@12 50; Mottled, $11 50@12 00. CAR WHEEL AND MALLEABLE—Southern (standard brands), $18 00@ 19 00; Southern (other brands), $17 00@17 50; Lake Superior, $19 50@20 50.

ST. LOUIS (reported by Rogers, Brown & Meacham): HOT BLAST COKE AND CHARCOAL—Southern Coke No. 1, $15 25@15 50; Southern Coke No. 2, $14 50@14 75; Southern Coke No. 3, $13 75@14 25; Southern Grey Forge, $13 00@ 13 25; Southern Charcoal No. 1, $17 00@17 50; Southern Charcoal No. 2, $16 25@16 75; Missouri Charcoal No. 1, $15 50@16 00; Missouri Charcoal No. 2, $15 00@15 50; Ohio Softeners, $18 00@ 19 00. CAR WHEEL AND MALLEABLE IRONS—Lake Superior, $19 50@20 00; Southern, $19 50@ 20 00. CONNELLSVILLE COKE—East St. Louis, $0 00; St. Louis, $5 65.

DETROIT (reported by William F. Jarvis & Co): Lake Superior Charcoal, all Numbers, $17 00@18 00; Lake Superior (coke) Bessemer, $16 50@17 00; Katahdin (Maine charcoal), $00 00 @00 00; Lake Superior Coke, Foundry, all ore, $17 00@18 00; Lake Superior Coke, Foundry, all ore, $00 00@00 00; Standard Ohio Black Band, $17 50@18 00; Southern No. 1 $15 25@15 50; Southern Gray Forge, $13 75@ 14 25; Jackson County (Ohio) Silvery, $18 00@ 18 50; Old Car Wheel, $00 00@00 00. Connellsville Coke, $0.00.

LOUISVILLE (reported by Geo. H. Hull & Co.): Southern Coke No. 1 Foundry $14 25@ 14 75; Southern Coke No. 2 Foundry $13 50@ 13 75; Southern Coke No. 3 Foundry $12 75@ 13 25; Grey Forge, $12 50@13 00; Southern Coke Silver Grey, $00 00@00 00; Southern Charcoal No. 1 Foundry, $15 75@16 75; Car Wheel, $17 75@19 75.

PITTSBURGH (reported by A. H. Childs): No. 1 Foundry, $15 50@16 00; No. 2 Foundry, $14 50@15 00; Grey Forge, $13 50@13 75; White and Motlled, $13 00@13 25; Warm Blast Charcoal, $18 00@22 00; Cold Blast Charcoal, $22 00 @26 00; Bessemer, $15 25@15 75.

## MERCHANT IRON AND STEEL.

### Flat Bar

| | |
|---|---|
| 1½ to 4 by ⅛ to 1 inch | 1 70 |
| 4¼ to 6 by ⅛ to 1 inch | 1 85 |
| 1½ to 6 by 1¼ to 2 inch | 2 15 |
| 1¼ & 1¾ by ⅛ to ¼ inch | 1 85 |
| 1 & 1¼ by ⅛ to ¼ inch | 1 95 |
| ⅜, ½ and ⅝ by ⅛ to ½ inch | 2 15 |

### Round and Square.

| | |
|---|---|
| 1 to 1¾ inch | 1 75 |
| 2 to 2½ inch | 1 95 |
| 2¾ to 3¼ inch | 2 25 |
| 3½ to 4 inch | 2 75 |
| 4¼ to 4¾ inch | 3 25 |
| 4¾ to 5 inch | 3 45 |

### Ova

| | |
|---|---|
| ¼ to 1¼ inch | 2 15 |
| ⅝ to ¾ inch | 2 25 |
| ⅞ | 2 55 |
| ½ | 2 95 |

### Half Oval and Half Round.

| | |
|---|---|
| ⅜ to 3 inch | 2 85 |
| ⅜ to 1¼ inch | 2 45 |
| ½ to ¾ inch | 3 05 |
| ⅝ | 3 25 |
| ¾ | 4 75 |

### Heavy Band.

| | |
|---|---|
| ¼ to 6 by ¼ and 5-16 inch | 1 55 |
| ¼ to 1¾ by ¼ and 5-16 inch | 2 05 |
| ½ to ⅞ by ¼ and 5-16 inch | 2 25 |
| ½ to ⅞ by ½ and 5-16 inch | 3 75 |

### Hoops.

| | |
|---|---|
| 1¼ to 4, Nos. 13 to 15 | 2 55 |
| 1¼ to 2, Nos. 16 to 18 | 2 65 |
| 1¼ to 2, No. 19 | 2 75 |
| 1¼ to 2, No. 20 | 2 85 |
| 1¼ to 2, No. 21 | 2 95 |
| 1¼ to 2, No. 22 | 3 05 |
| 15-16, 1 and 1⅛, Nos. 13 to 15 | 2 75 |
| 15-16, 1 and 1⅛, Nos. 16 to 18 | 2 85 |
| 15-16, 1 and 1⅛, Nos. 19 and 20 | 2 95 |
| 15-16, 1 and 1⅛, No. 21 | 3 05 |
| 15-16, 1 and 1⅛, No. 22 | 3 15 |
| ⅞, Nos. 13 to 15 | 2 95 |
| ⅞, Nos. 16 to 18 | 3 05 |
| ⅞, Nos. 19 and 20 | 3 15 |
| ⅞, No. 21 | 3 25 |
| ⅞, No. 22 | 3 35 |
| 13-16, Nos. 13 to 15 | 3 15 |
| 13-16, Nos. 16 to 18 | 3 25 |
| 13-16, Nos. 19 and 20 | 3 35 |
| 13-16, No. 21 | 3 45 |
| 13-16, No. 22 | 3 55 |
| ¾, Nos. 13 to 15 | 3 25 |
| ¾, Nos. 16 to 18 | 3 45 |
| ¾, Nos. 19 and 20 | 3 55 |
| ¾, No. 21 | 3 65 |
| ¾, No. 22 | 3 75 |
| 11-16, Nos. 13 to 15 | 3 55 |
| 11-16, Nos. 16 to 18 | 3 65 |
| 11-16, Nos. 19 and 20 | 3 75 |
| 11-16, No. 21 | 3 85 |
| 11-16, No. 22 | 3 95 |
| ⅝, Nos. 13 to 15 | 3 75 |
| ⅝, Nos. 16 to 18 | 3 95 |
| ⅝, Nos. 19 and 20 | 4 05 |
| ⅝, No. 21 | 4 15 |
| ⅝, No. 22 | 4 25 |
| ⅝, No. 23 | 4 45 |

### Light Band.

| | |
|---|---|
| 1¾ to 6 by ⅛ to 3-16 in | 2 20 |
| 1¾ to 6 by Nos. 11 and 12 | 2 30 |
| 1 to 1¾ by ⅛ to 3-16 in | 2 40 |
| 1 to 1¾ by Nos. 11 and 12 | 2 50 |
| ⅞ and 13-16 by ⅛ to 3-16 in | 2 70 |
| ⅞ and 1 3-16 by Nos. 11 and 12 | 2 80 |
| ¾ and 11-16 by ⅛ to 3-16 in | 3 00 |
| ¾ and 11-16 by Nos. 11 and 12 | 3 10 |
| ⅝ and 9-16 by ⅛ to 3-16 in. | 3 30 |
| ⅝ and 9-16 by Nos. 11 and 12 | 3 40 |
| ½ by ⅛ to 3-16 in | 3 60 |
| ½ by Nos. 11 and 12 | 3 70 |

### Wagon Box Iron.

| | | | |
|---|---|---|---|
| ¾ inch, beveled edge, by Nos. | 11 and 12 | | 2 80 |
| ¾ inch, " " " | 13 and 14 | | 3 00 |
| ¾ inch, " " " | 11 and 12 | | 3 10 |
| ¾ inch, " " " | 13 and 14 | | 3 30 |

### Sheet Iron.

| | |
|---|---|
| No. 10 to 14 | 2 45 |
| No. 15 to 17 | 2 55 |
| No. 18 to 21 | 2 75 |
| No. 22 to 24 | 2 85 |
| No. 25 to 26 | 2 95 |
| No. 27 | 3 25 |
| No. 28 | 3 50 |

### Iron Boiler Plates.

| | |
|---|---|
| Tank, ¼ inch and heavier | 2 25 |
| C No. 1, " " | 2 40 |
| C H No. 1 " " | 2 50 |
| C H Flange, " " | 3 10 |
| Extra Flange, " | 4 00 |
| Solid Fire Box " | 4 75 |

### Steel Boiler Plates—1-4 in. and Heavier.

| | |
|---|---|
| Tank | 2 25 |
| Shell | 2 50 |
| Flange | 2 75 |
| Marine Flange | 3 00 |
| Fire Box | 4 00 |

Above includes plates 90 inches wide.

| | |
|---|---|
| 90 to 96 in. wide | ⅛c lb extra |
| 96 to 100 in. wide | 1 c " |
| 100 to 104 in. wide | 1⅛c " |
| 104 to 116 in. wide | special |

### American Cast Tool Steel.

| ROUND, SQUARE AND OCTAGON. | cts. lbs |
|---|---|
| 1 to 2 in. inclusive | 8 |
| 9-16 to ⅞ in " | 8½ |
| 7-16 to ¾ and 2⅜ to 3 in | 9 |
| 3⅛ to 4 in | 9½ |
| ⅜ to 11-16 and 4⅛ | 10 |
| ⅛ to 6 in | 10½ |
| ¼ to 9-32 and 6⅛ to 7 in | 11 |
| 3-6 in | 13 |

### Flats.

| | cts. lbs |
|---|---|
| 2 to 9-16 wide by 2 to ⅛ thick | 8 |

### Bessemer and O. H. Steel.

| | | |
|---|---|---|
| Machinery | base price, | 2 35 |
| Tire | " | 2 25 |
| Spring | " | 2 80 |
| Sleigh Shoe | " | 2 50 |
| Toe Calk | " | 2 35 |
| Cutter Shoes, tapered and burr. | " | 2 75 |

### English Tool Steel.

| | |
|---|---|
| Jessop's | 15¾c |
| Hobson's "Best" | 15½c |
| " "Choice" | 15 c |

### Burden Boiler Rivets.

| | |
|---|---|
| ⅝, ¾, 11-16 and ⅞ inches diameter | 4 00 |
| Bridge ⅝, ¾, 11-16 and ⅞ inch diam | 4 00 |

## SCRAP IRON AND OLD METAL.

| | Net Tons |
|---|---|
| No. 1 R. R. wrought scrap | $18 00 |
| No. 1 wrought scrap | 16 50 |
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| Iron axles | 23 50 |
| Axle turnings | 13 50 |
| Wrought turning (free from cast) | 11 50 |
| Cast borings | 8 00 |
| Uncut wrought iron boilers | 11 50 |
| Steel boiler plates | 16 00 |
| Grate Bars | 8 00 |
| Pipes and flues (Clean) | 12 00 |
| Tank iron | 12 50 |
| Hoop and band iron | 9 50 |
| Sheet iron | 8 50 |
| Wrought drillings | 11 00 |
| Malleable iron | 9 50 |

Reported by Messrs. BLACK & POLLOCK, Cincinnati, O.:

| | |
|---|---|
| Railroad Wrought | $20 00 |
| No. 1 Country Wrought | 17 00 |
| Stove Plate | 8 75 |
| Machine Castings | 11 00 |
| Hoop and Sheet | 8 00 |
| Casting Borings | 9 00 |
| Wrought Turnings | 10 00 |

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Cleveland, O.

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PETER GERLACH & CO.,
MAKERS OF
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Cleveland, O., U. S. A

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DEALERS IN
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CLEVELAND, O.

OGLEBAY, NORTON & CO.,
Successors to Tuttle, Oglebay & Co.,
Commission Dealers in
Iron - Ores,
FROM MARQUETTE, GOGEBIC AND MENOMINEE DISTRICTS,
CLEVELAND, OHIO.

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J. H. OUTHWAITE & CO.,
Exclusive attention given to
LAKE SUPERIOR AND MENOMINEE RANGE
Iron Ore,
Perry-Payne B'ld'g. Cleveland, O.

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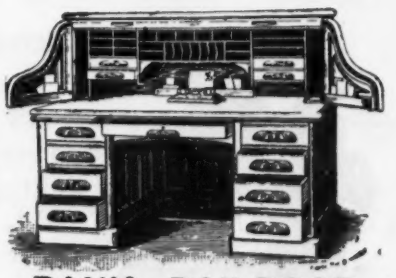
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### Anvils.

American.....₩ lb 9@10
Wrights.....₩ lb 12

### Bellows.

Blacksmiths' { Hill's.....dis 40 / Bullock's.....dis 50&10
Moulders'.....dis 40@40&10
Hand.....dis 40&10@50

### Belting.

Boston Belting Co's standard.....dis 70
" " " extra.....dis 60&5
" " " best.....dis 55
Hoyt's Short Lap.....dis 45
Cleveland Rubber Co. extra standard..dis 60&10
Shults Raw Hide Leather Belting, single, .....dis 40
Shults Raw Hide Leather Belting, double, and Light Double.....dis 40
Standard, oak tanned.....dis 50&10
Alexander Brothers' pure oak tanned. ...dis 45

### Blowers and Exhausters.

B. F. Sturtevant's.....dis 20
Boston Blower Co.....dis 35
Buffalo.....dis 35

### Borax.

.....₩ lb 12

### Chalk.

White.....₩ gross 50
White Crayon.....₩ gross 12@12½ dis 10
Red.....dis 70
Blue.....dis 85

### Chucks.

Cushman's 4 Jaw Independent.....dis 45
" Combination.....dis 40
" Geared Scroll.....dis 30
" 2 Jaw Brass Workers.....dis 30
" Drill.....dis 35
Wescott's Scroll Combination.....dis 33⅓
" Independent.....dis 40
" Little Giant Drill.....dis 30
Horton's Universal.....dis 40
" Independent.....dis 45
Whiton's Independent.....dis 45
National Combination.....dis 40
Sweetland " .....dis 40
Almond Drill.....dis 20
Morse " .....dis 15
Skinner's Combination Lathe.....dis 33⅓
" Independent Lathe.....dis 40
" Universal Lathe.....dis 40
" Drill.....dis 15

### Cutters and Reamers.

Cleveland.....dis 10@15
Pratt & Whitney.....dis 10@15
Standard.....dis 10@15
Brown & Sharpe, Milling Cutters.....dis 15
" Gear Cutters.....dis 15

### Crowbars.

Cast Steel.....₩ lb 4
Iron, steel points.....₩ lb 3½

### Drill and Drill Sockets.

Twist drills.....dis 50&10
Morse Taper and Straight shank to 1¼".....dis 50&10
Morse Taper and Straight shank Larger than 1¼".....dis 25
Drill Sockets.....dis 25
Standard Twist Drills.....dis 55@55&5
Cleveland " " .....dis 55@55&5

### Emery.

| | No. 4 to 46 gr. | No. 54 to 150. gr. | Flour, F. | C. F. FF. |
|---|---|---|---|---|
| Kegs, ₩ lb | 4 c | 5 c | | 2¾c |
| ½ kegs ₩ lb | 4½c | 5½c | | 2¾c |
| ¼ kegs ₩ lb | 4¾c | 5¾c | | 3 c |
| 6 lb cans, 10 in case | 6 c | 6¾c | | 3 c |
| 6 lb cans, less than 1 | 10 c | 10 c | | 7¾c |

### Emery Cloth and Paper.

Barder, Adamson & Co.....dis 45@50
H. H. Barton.....dis 50@50&10

### Emery Wheels.

Detroit.....dis 55@60
Norton's.....dis 55@60
Grant.....dis 55@60
Sterling.....dis 60
Celluloid.....dis 10&33⅓
Northampton.....dis 55
Crystal.....dis 65@70
Vitrified.....dis 60
Vulcanite.....dis 10&10

### Files.

Nicholson.....dis 60&10@60&10&10
" X. F.....dis 25
Kearney & Foot.....dis 60&10@60&10&10
Black Diamond.....dis 60&10@60&10&10
Arcade.....dis 60&10@60&10&10
Disston's.....dis 65@70
Western.....dis 70
Stub's.....dis 25
Grobet's.....dis 50
Reynolds Bros.' Hand Cut.....dis 50
ndustry File Works, hand cut.....dis 50

### Hammers.

P. S. W.....dis 40
Atha new list, Jan. 15, 1887.....dis 50
Heavy hammers and sledges under 5 lbs. 18c over 5 lbs 14c, new list.

### Jack Screws.

Illinois Bolt Co. list.....dis 70

### Nuts and Washers.

| Size of bolt inches | ¼ | 5-16 | ⅜ | ½ | ⅝ | ¾ | 1 |
|---|---|---|---|---|---|---|---|
| Square | 8 | 7 | 5½ | 4½ | 4 | 3½ | 2½ |
| Hexagon | 15¾ | 11½ | 8½ | 6 | 5½ | 5¼ | 5 |
| Washers | 9 | 8 | 7 | 5 | 4½ | 4½ | 4½ |

In lots less than 100 lbs, ₩ lb add ½c., 1 lb boxes add 1c to list.

### Nails (wire.

List July 14, 1887.....dis 70 &10
Standard Penny Nails, ₩ keg card rate
{ Car lots.....$2.30 / Less than car lots $2.40

### Oilers.

Zinc and Tin.....dis 60
Brass and Copper.....dis 50
Malleable (Hammer's), No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ₩ doz.....dis 10@10&10

### Packing, Steam.

Boston Belting Co.....dis 60
American Packing Hemp.....₩ lb 10@11
Russia Packing " .....₩ lb 14
Italian Packing " .....₩ lb 13@14
Plumbago Piston.....₩ lb 40
Morrison's " .....₩ lb 50
Square Flax " .....₩ lb 50
Sheet Rubber.....₩ lb 12&24
Excelsior Rubber.....₩ lb 48

### Picks.

Railroads, 5 to 6 lbs.....$12 dis 60
" 6 to 7 lbs.....$13 dis 60

### Pulleys.

Iron Pulleys, Walker List.....dis 45
Medart Pulleys.....dis 55
Split Wood Pulleys.....dis 50@55

### Rivets.

Iron, Thousand, list November 17, .....dis 50
Iron, Ordinary, Cooper's Block and Carriage list November 17.....dis 50
Copper.....dis 50@50&10

### Rope.

Manilla, ¼ inch and over.....₩ lb 15¾
Sisal, ¼ inch and over.....₩ lb 13¾

### Sand Paper.

B. A. & Co.....dis 45@50
H. H. Barton's.....dis 40@45
New England Flint.....dis 40@50
Barton's Garnet.....dis 20

### Saws.

Disston's Circular.....dis 40@10
" Band.....dis 20
" Scroll.....Net
Hack Saw Stubs.....dis 20
" " Eureka.....dis 20
" " Star.....dis 20
Saw Swages Disston's.....dis 30
Atkins' Cicular Saws.....dis 40&45
" Mill, Mulay and Drag Saws..dis 40&10
" Wood Saws.....dis 40&10
" Silver Steel Diamond Cross-cut Saws.....dis 70c per ft
" Dexter Cross-cuts.....dis 50c "
" Diamond " .....dis 30c "
" Tuttle Tooth Cross-cuts..dis 25c "
" One-man Cross-cuts.....dis 32c "
No. 1 Handles.....dis 25c per pair
No. 6 " .....dis 16c "
Excelsior Saw Tools.....$6 per doz
Perfection " .....$15 "
Detroit Saw Works, Circular.....dis 50
" " " Band.....dis 25
" " " Mulay.....dis 45

### Screws.

Wood Screws—New List 1890.

Flat head iron.....dis 72½
Round head iron.....dis 67½
Flat head brass.....dis 72½
Round head brass.....dis 65
Square Cap.....dis 65
Hexagon Cap.....dis 60
Set C. H. C. P.....dis 70
Machine, flat head, iron.....dis 65
Machine, round head, iron.....dis 60
Bench and hand—
Lag or coach.....dis 75@75&10
Coach, patent gimlet point.....dis 75

### Shovels and Spades.

Ames' list November 1, 1885.....dis 20
Dennis.....dis 5.25
Hussey & Binns, railroad.....dis 8.00

### Taps.

Cards, Hand and Nut to 2 in.....dis 50
Carpenters' " " " .....dis 50
Morse " " " .....dis 50
Pratt & Whitney " " new list dis 10
Machine Screw Taps.....dis 55
Pipe Taps to 2¼ in.....dis 70
Stay Bolt Taps.....dis 25
Stove Bolt Taps.....dis 50
Pulley Taps.....dis 40

### Twine.

| | BC. | B. |
|---|---|---|
| No. 12, Flax Twine, ¼ and ½ lb Balls | 31c@29c | |
| No. 18 " " ¼ and ½ " | 18c@28c | |
| No. 36 " " ¼ and ¼ " | 16c@27c | |
| 2-Ply Hemp, ¼ & ½ lb Balls (Spring Twine | 11½c | |
| 3-Ply " 1 lb Balls | 12@12½c | |
| 3-Ply " 1½ lb Balls | 11@11½c | |
| Cotton Wrapping, 5 Balls to lb | 15@16c | |

### Vises.

Solid Box.....dis 60
Parker's.....dis 20@25
Prentiss.....dis 20
Stephen's.....dis 25@30
Barrett's.....dis 30
Miller's Falls.....dis 40
Merrill's.....dis 15@20
Howard.....dis 35

### Wire.

New List, Jan. 18, 1884

Brass and copper.....dis 20@25
Bright and annealed, Nos. 0@18...dis 70&10@75
" " Nos. 19@26..dis 75@75& 5
" " Nos. 27@36..dis 75&10& 5
Coppered Nos. 0 to 18, market list..dis 70@70& 5
Galvanized Nos. 0 to 18 " " .....dis 65&5
Tinned market Nos. 0 to 18.....dis 67½
Cast steel.....dis 50
Tinned Broom Wire.....dis 70&5@70&10
Annealed Fence, Nos. 8 and 9.....dis 75
Annealed Grape, Nos. 10 to 14.....dis 75
Stub's Steel Wire, regular.....$6.00 ₩ lb dis 3

### Wrenches.

Coe's genuine, .....dis 50
Girard Standard.....dis 70&10
Agricultural.....dis 75&10
Mechanics'.....dis 55&10, & 2
Bemis & Call's Combination .....dis 35
Donohue's Engineers.....dis 20&10
Lamson & Sessions Engineers.....dis 60
Billings & Spencer's Drop Forged.....dis
William's " " .....dis
Alligator " " .....dis


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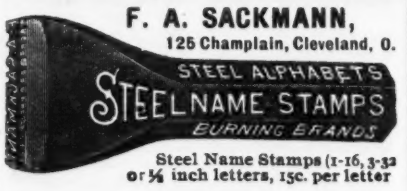


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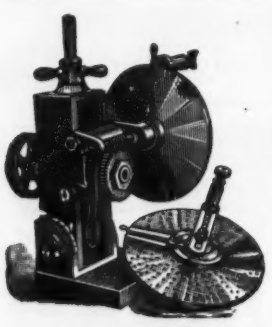

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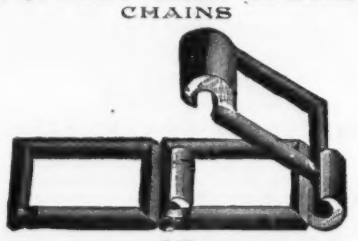

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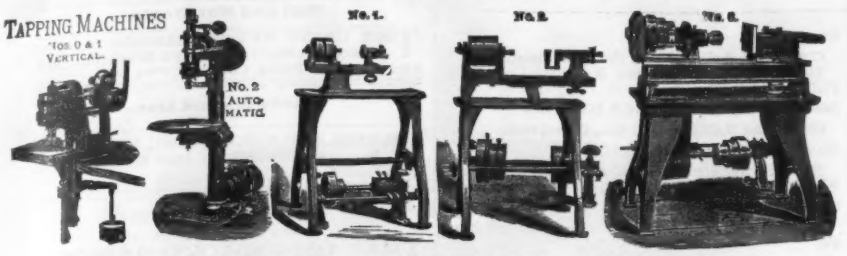


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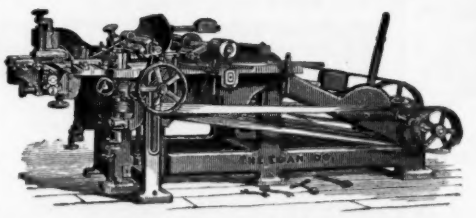

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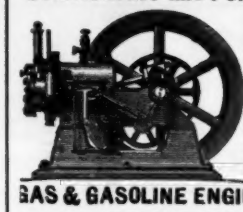

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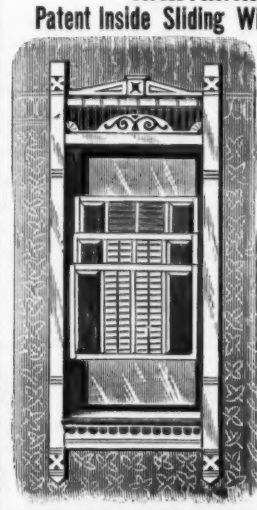

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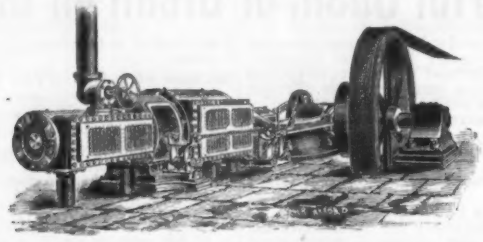

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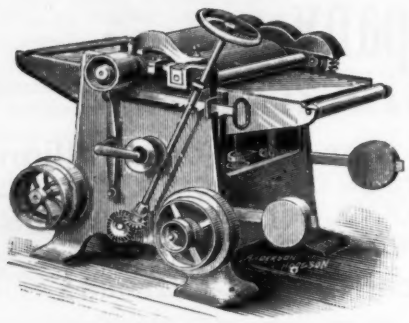

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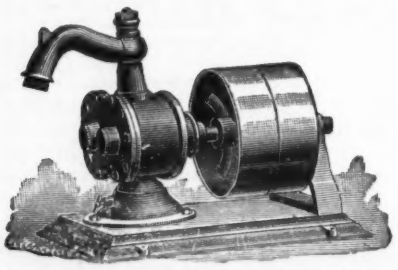

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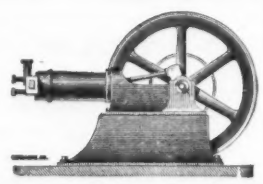

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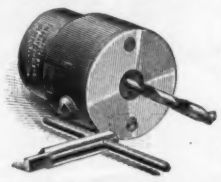

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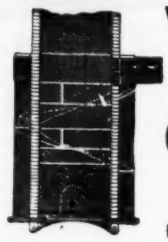

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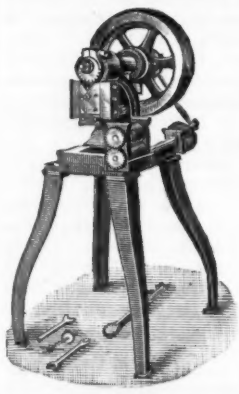

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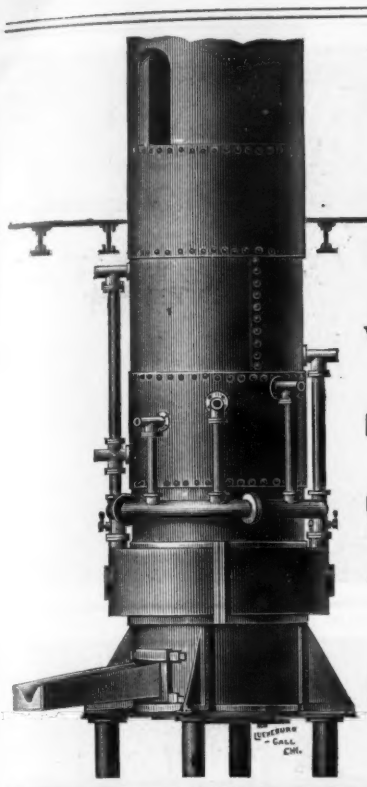

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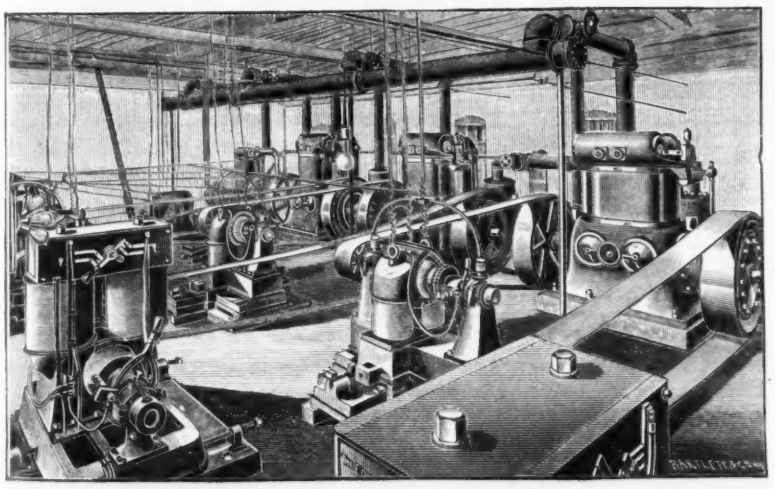

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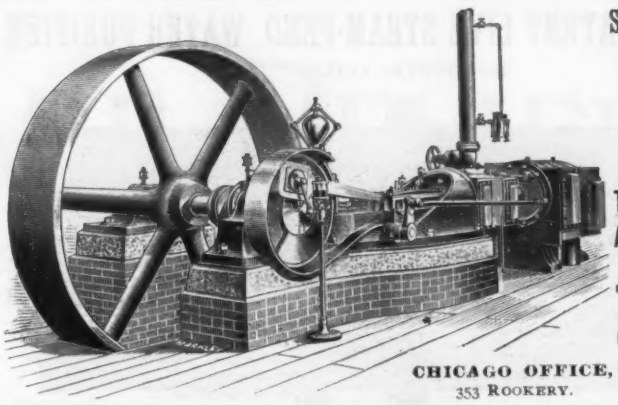

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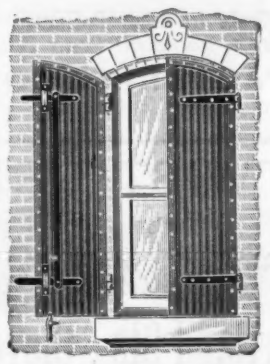

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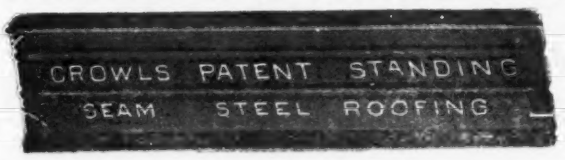


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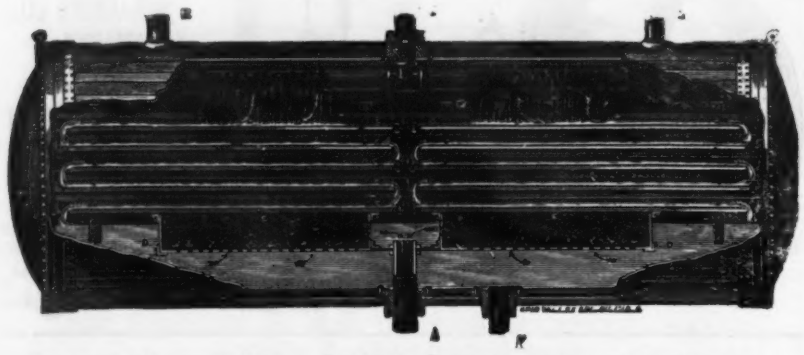

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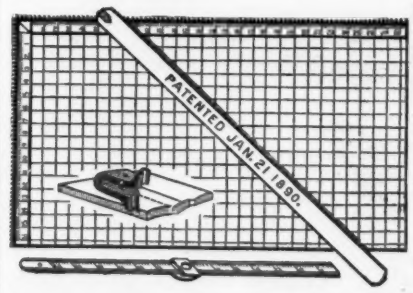


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